

# VISIBLE LED DATA BOOK



**marktech**  
international,  
corp.

**ATKINSON & ROSS ASSOCIATES**

LIMITÉE  
LIMITED

TORONTO: 18 GLENMOUNT CT., WHITBY, ONTARIO L1N 5M8

TELEPHONE: (416) 666-8359 FAX: (416) 666-8360

MONTREAL: 323 DE LA BOULERAIE, ST. LAZARE, QUEBEC J0P 1V0

TELEPHONE: (514) 424-5679 FAX: (514) 424-5678



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# INTRODUCTION

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Marktech International is pleased to introduce our new visible optoelectronic data book. Now in our seventh year, Marktech maintains two manufacturing facilities in Latham, New York (located outside of Albany) and Kawasaki City, Japan.

Among the services we perform at our Latham Facility are:

1. Complete manufacturing capabilities from initial development to finished end product.
2. Test and measuring which includes spectral characteristics, luminous intensity, and wavelength sorting.
3. Value added services including military qualifications for customers who require their components to meet strict compliance with these standards.
4. In-house prototype facility which allows for a quick turn around of new product designs to help assure device feasibility prior to manufacturing.

In addition, all quality control and quality assurance is performed at our headquarters. Our warehouse has an abundant stock of all products featured in our catalog. Sales support is provided by our in-house staff of technical sales and engineering people. Marktech further maintains a network of representatives and stocking distributors with locations throughout the United States, Canada and Europe.

We welcome all inquiries.







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# TABLE OF CONTENTS

---

	PAGE
<b>ALPHA NUMERIC LISTING</b> .....	v
<b>ULTRA BRIGHT LED LAMPS</b> .....	
T-1 LED Lamps .....	1
5000mcd T-1 3/4 LED Lamp .....	4
T-1 3/4 LED Lamps .....	5
10mm Gumdrops LED Lamps .....	8
T-1 3/4 Tapered LED Lamps .....	9
3mm Ceramic Stem LED Emitters .....	10
LED Emitters .....	11
<b>STANDARD LED LAMPS</b> .....	
T-1 LED Lamps .....	14
4mm LED Lamps .....	18
T-1 3/4 LED Lamps .....	19
Low Profile T-1 3/4 LED Lamps .....	21
T-1 3/4 Tapered LED Lamps .....	22
8mm LED Lamps .....	23
<b>RECTANGULAR LED LAMPS</b> .....	24
<b>CYLINDRICAL LED LAMPS</b> .....	32
<b>TRI-STATE LED LAMPS</b> .....	35
<b>LOW CURRENT LED LAMPS</b> .....	36
<b>AXIAL LEADED LED LAMPS</b> .....	
Axial Leaded LED Lamps .....	38
Bi-Color Axial Leaded LED Lamps .....	40
<b>SURFACE MOUNT LED LAMPS</b> .....	41
<b>SPECIALTY LED LAMPS</b> .....	
Integrated Resistor LED Lamps .....	42
Special Shaped LED Lamps .....	43
Blinking LED Lamps .....	44



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# TABLE OF CONTENTS

---

<b>BLUE LEDS</b> .....	45
<b>MULTI-CHIP LED LAMPS</b> .....	46
<b>PACKAGED LED LAMPS</b>	
PCB Mount LED Lamps .....	51
PCB Mount Indicator LED Lamps .....	53
<b>LARGE SURFACE LAMPS</b>	
LED Light Bars .....	54
LED Lamp Arrays.....	56
LED Luminators .....	62
<b>DISPLAYS</b>	
Seven Segment Digital Displays .....	65
Dual Digit Seven Segment Displays .....	69
2 & 3 Digit Seven Segment Displays .....	71
4 Digit Seven Segment Displays.....	72
Intelligent Seven Segment Displays.....	73
Alpha Numeric Displays .....	74
Intelligent Alpha Numeric Displays.....	76
Dot Matrix Displays .....	77
Bi-Color Dot Matrix Displays .....	79
<b>MATERIALS</b> .....	81
<b>APPLICATION NOTES</b> .....	82

Specifications are subject to change without notice.



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# ALPHA NUMERIC LISTING

MT60-UR.....5	MT130-SLY.....19	MT260A-UR.....2	MT540-Y.....22
MT80F-UR.....11	MT131L-ER.....50	MT300-UR.....5	MT600-CUG.....3
MT85F-UR.....11	MT131L-HR.....50	MT303-HR.....39	MT600-CUR.....3
MT100-UR.....5	MT131L-PG.....50	MT305-SLG(2mA).....37	MT600-UR.....5
MT101NP-ER.....48	MT131L-SO.....50	MT305-SLHR(2mA).....37	MT605F-G.....44
MT101NP-HR.....48	MT131L-UG.....50	MT305-SLUR(2mA).....37	MT605F-HR.....44
MT101NP-PG.....48	MT131L-UR.....50	MT305-SLY(2mA).....37	MT605F-UR.....44
MT101NP-SO.....48	MT131L-YL.....50	MT305B-SLUG.....8	MT605F-Y.....44
MT101NP-UG.....48	MT140-SLG.....19	MT305C-SLUR.....8	MT630-G.....16
MT101NP-UR.....48	MT140-SLHR.....19	MT305E-SLUR.....8	MT630-HR.....16
MT101NP-YL.....48	MT140-SLO.....19	MT315B-SLUG.....8	MT630-O.....16
MT104F-ER.....47	MT140-SLUR.....19	MT315C-SLUR.....8	MT630-UR.....16
MT104F-HR.....47	MT140-SLY.....19	MT315E-SLUR.....8	MT630-Y.....16
MT104F-PG.....47	MT150-UR.....5	MT300-CUG.....7	MT631-UR1.....8
MT104F-SO.....47	MT200-CUG.....7	MT350A-CUG.....7	MT631-UR2.....8
MT104F-UG.....47	MT200P-R.....38	MT355-HRG.....40	MT631-UR3.....8
MT104F-UR.....47	MT200S-UR.....38	MT400-CUG.....7	MT640-G.....16
MT104F-YL.....47	MT201P-R.....38	MT400-CUR.....7	MT640-HR.....16
MT104M-ER.....47	MT201S-UR.....38	MT400A-Y.....38	MT640-O.....16
MT104M-HR.....47	MT201SV-ER.....49	MT401A-Y.....38	MT640-UR.....16
MT104M-PG.....47	MT201SV-HR.....49	MT404-Y.....39	MT640-Y.....16
MT104M-SO.....47	MT201SV-PG.....49	MT410A-Y.....39	MT700-CUR.....7
MT104M-UG.....47	MT201SV-SO.....49	MT411A-Y.....39	MT800-UR.....5
MT104M-UR.....47	MT201SV-UG.....49	MT420A-Y.....38	MT850-UR.....9
MT104M-YL.....47	MT201SV-UR.....49	MT421A-Y.....38	MT900-UR.....5
MT105-HLG.....20	MT201SV-YL.....49	MT430-G.....21	MT1010-R.....30
MT105-HLHR.....20	MT202-UR.....39	MT430-HR.....21	MT1041-R.....18
MT105-HLY.....20	MT210P-R.....39	MT430-O.....21	MT1041-RG.....18
MT106F-BL.....46	MT210S-UR.....39	MT430-UR.....21	MT1042-G.....18
MT106F-ER.....46	MT211P-R.....39	MT430-Y.....21	MT1043-Y.....18
MT106F-HR.....46	MT211S-UR.....39	MT440-G.....21	MT1044-HR.....18
MT106F-PG.....46	MT220P-R.....38	MT440-HR.....21	MT1044-O.....18
MT106F-SO.....46	MT220S-UR.....38	MT440-O.....21	MT1103-R.....15
MT106F-UG.....46	MT221P-R.....38	MT440-UR.....21	MT1103-RG.....15
MT106F-UR.....46	MT221S-UR.....38	MT440-Y.....21	MT1110-RG.....30
MT106F-YL.....46	MT230-CUR.....2	MT450-UR.....9	MT1111-R.....43
MT108C-UR.....13	MT230-G.....14	MT500P-G.....38	MT1111-RG.....43
MT108L-UR3.....13	MT230-HR.....14	MT501P-G.....38	MT1112-R.....32
MT108M-UR3.....13	MT230-O.....14	MT505-G.....39	MT1112-RG.....32
MT108SL-UR3.....13	MT230-UR.....14	MT510P-G.....39	MT1113-R.....34
MT108W-UR3.....13	MT230-Y.....14	MT511.....12	MT1113-RG.....34
MT120-UR.....5	MT230A-UR.....2	MT511P-G.....39	MT1116-R.....25
MT121L-ER.....50	MT240-CUR.....2	MT520P-G.....38	MT1116-RG.....25
MT121L-HR.....50	MT240-G.....14	MT521P-G.....38	MT1117-R.....20
MT121L-PG.....50	MT240-HR.....14	MT530-G.....22	MT1117-RG.....20
MT121L-SO.....50	MT240-O.....14	MT530-HR.....22	MT1118-12VR.....42
MT121L-UG.....50	MT240-UR.....14	MT530-O.....22	MT1118-5VR.....42
MT121L-UR.....50	MT240-Y.....14	MT530-R.....22	MT1118-BL.....45
MT121L-YL.....50	MT240A-UR.....2	MT530-Y.....22	MT1118G-12VR.....42
MT130-SLG.....19	MT250-CUR.....2	MT540-G.....22	MT1118G-5VR.....42
MT130-SLHR.....19	MT250-UR.....5	MT540-HR.....22	MT1119-R.....29
MT130-SLO.....19	MT250A-UR.....2	MT540-O.....22	MT1119-RG.....29
MT130-SLUR.....19	MT255-URG.....40	MT540-R.....22	MT1123-R.....26



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# ALPHA NUMERIC LISTING

MT1123-RG .....	26	MT2103-G .....	15	MT3164-YCT .....	51	MT4137-O .....	33
MT1130-R .....	26	MT2110-G .....	30	MT3164S2-Y .....	51	MT4141-HR .....	34
MT1130-RG .....	26	MT2111-G .....	43	MT3164S3-Y .....	52	MT4141-O .....	34
MT1132-R .....	33	MT2112-G .....	32	MT3172-Y .....	28	MT4146-HR .....	24
MT1132-RG .....	33	MT2113-G .....	34	MT3173-Y .....	29	MT4146-O .....	24
MT1137-R .....	33	MT2116-G .....	25	MT3178-Y .....	30	MT4152-HR .....	27
MT1137-RG .....	33	MT2117-G .....	20	MT3189-Y .....	25	MT4152-O .....	27
MT1141-R .....	34	MT2118-12VG .....	42	MT3194-Y .....	24	MT4159-HR .....	17
MT1141-RG .....	34	MT2118-5VG .....	42	MT3195-Y .....	32	MT4159-O .....	17
MT1146-R .....	24	MT2119-G .....	29	MT3198-Y .....	23	MT4164-HRCT .....	51
MT1146-RG .....	24	MT2123-G .....	26	MT3200-UR .....	4	MT4164-OCT .....	51
MT1152-R .....	27	MT2130-G .....	26	MT3303-Y .....	15	MT4164S2-HR .....	51
MT1152-RG .....	27	MT2132-G .....	33	MT3498-Y .....	23	MT4164S2-O .....	51
MT1158-RG .....	28	MT2137-G .....	33	MT4000-UR .....	4	MT4164S3-HR .....	52
MT1159-R .....	17	MT2141-G .....	34	MT4041-R .....	18	MT4164S3-O .....	52
MT1159-RG .....	17	MT2146-G .....	24	MT4041-RG .....	18	MT4172-HR .....	28
MT1164-RCT .....	51	MT2152-G .....	27	MT4042-G .....	18	MT4172-O .....	28
MT1164-RGCT .....	51	MT2158-G .....	28	MT4043-Y .....	18	MT4173-HR .....	29
MT1164S2-R .....	51	MT2159-G .....	17	MT4044-HR .....	18	MT4173-O .....	29
MT1164S2-RG .....	51	MT2164-GCT .....	51	MT4044-O .....	18	MT4178-HR .....	30
MT1164S3-R .....	52	MT2164S2-G .....	51	MT4093-G(2mA) .....	37	MT4178-O .....	30
MT1164S3-RG .....	52	MT2164S3-G .....	52	MT4093-HR(2mA) .....	37	MT4189-HR .....	25
MT1172-R .....	28	MT2172-G .....	28	MT4093-UR(2mA) .....	37	MT4189-O .....	25
MT1172-RG .....	28	MT2173-G .....	29	MT4093-Y(2mA) .....	37	MT4193B-UG .....	3
MT1173-R .....	29	MT2178-G .....	30	MT4093B-UG .....	3	MT4193E-UR .....	3
MT1173-RG .....	29	MT2189-G .....	25	MT4093E-UR .....	3	MT4194-HR .....	24
MT1178-R .....	30	MT2194-G .....	24	MT4103-HR .....	15	MT4194-O .....	24
MT1178-RG .....	30	MT2195-G .....	32	MT4103-O .....	15	MT4195-HR .....	32
MT1189-R .....	25	MT2198-G .....	23	MT4110-HR .....	30	MT4195-O .....	32
MT1189-RG .....	25	MT2303-G .....	15	MT4110-O .....	30	MT4198-HR .....	23
MT1194-R .....	24	MT2498-G .....	23	MT4111-HR .....	43	MT4198-O .....	23
MT1194-RG .....	24	MT2500-UR .....	5	MT4111-O .....	43	MT4252-HR .....	27
MT1195-R .....	32	MT2500E-UR .....	10	MT4112-HR .....	32	MT4303-O .....	15
MT1195-RG .....	32	MT2500G-UR .....	10	MT4112-O .....	32	MT4498-HR .....	23
MT1198-R .....	23	MT3103-Y .....	15	MT4113-HR .....	34	MT4498-O .....	23
MT1198-RG .....	23	MT3110-Y .....	30	MT4113-O .....	34	MT5000-UR .....	4
MT1218-BL .....	45	MT3111-Y .....	43	MT4116-HR .....	25	MT5491-HRG .....	35
MT1250-UR .....	9	MT3112-Y .....	32	MT4116-O .....	25	MT5491-RG .....	35
MT1252-R .....	27	MT3113-Y .....	34	MT4117-HR .....	20	MT5491-YG .....	35
MT1303-R .....	15	MT3116-Y .....	25	MT4117-O .....	20	MT6010-Y .....	43
MT1303-RG .....	15	MT3117-Y .....	20	MT4118-12VHR .....	42	MT6010B-G .....	43
MT1318-BL .....	45	MT3118-12VY .....	42	MT4118-12VO .....	42	MT6010B-HR .....	43
MT1418-BL .....	45	MT3118-5VY .....	42	MT4118-5VHR .....	42	MT6010D-UR .....	43
MT1498-R .....	23	MT3119-Y .....	29	MT4118-5VO .....	42	MT6203-HRG .....	36
MT1498-RG .....	23	MT3123-Y .....	26	MT4119-HR .....	29	MT6224-HRG .....	36
MT1500-UR .....	5	MT3130-Y .....	26	MT4119-O .....	29	MT6224-RG .....	36
MT1600-UR .....	4	MT3132-Y .....	33	MT4123-HR .....	26	MT6224-YG .....	36
MT2030-HRG .....	35	MT3137-Y .....	33	MT4123-O .....	26	MT7103-UR .....	1
MT2030-RG .....	35	MT3141-Y .....	34	MT4130-HR .....	26	MT7103A-UR .....	1
MT2030-YG .....	35	MT3146-Y .....	24	MT4130-O .....	26	MT7118-UR .....	6
MT2053-HRG .....	31	MT3152-Y .....	27	MT4132-HR .....	33	MT7118A-UR .....	6
MT2053-RG .....	31	MT3158-Y .....	28	MT4132-O .....	33	MT7203-UR .....	1
MT2053-YG .....	31	MT3159-Y .....	17	MT4137-HR .....	33	MT7203A-UR .....	1



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MT7218-UR.....6	MTA8010-G.....56	MTAN4139-AO.....74	MTBLA414-O.....62
MT7218A-UR.....6	MTA8010-R.....56	MTAN4139-CHR.....74	MTBL1411-RG.....62
MT7303-UR.....1	MTAN1112-11A.....77	MTAN4139-CO.....74	MTBL1412-RG.....62
MT7303A-UR.....1	MTAN1112-21C.....77	MTAN4140-12A.....79	MTBL1423-RG.....62
MT7318-UR.....6	MTAN1120-ASR.....78	MTAN4140-22C.....79	MTBL1414-RG.....62
MT7318A-UR.....6	MTAN1120-CSR.....78	MTAN4140R-12A.....79	MTBL2410-G.....64
MT7386-UR.....9	MTAN1123-11A.....78	MTAN4140R-22C.....79	MTBL2411-G.....62
MT7403-UR.....1	MTAN1123-21C.....78	MTAN4254-11A.....75	MTBL2412-G.....62
MT7403A-UR.....1	MTAN1135-ASR.....77	MTAN4254-11C.....75	MTBL2413-G.....62
MT7418-UR.....6	MTAN1135-CSR.....77	MTAN4254-11I.....76	MTBL2414-G.....62
MT7418A-UR.....6	MTAN1139-ASR.....74	MTAN4254-21A.....75	MTBL3410-Y.....64
MT8163-BL.....45	MTAN1139-CSR.....74	MTAN4254-21C.....75	MTBL3411-Y.....62
MT8263-BL.....45	MTAN1140-12A.....79	MTAN4254R-11A.....75	MTBL3412-Y.....62
MT8363-BL.....45	MTAN1140-22C.....79	MTAN4254R-11C.....75	MTBL3413-Y.....62
MT8463-BL.....45	MTAN1254-11A.....75	MTAN4254R-11I.....76	MTBL3414-Y.....62
MT9081-HRG.....36	MTAN1254-11C.....75	MTAN4254R-21A.....75	MTBL4410-HR.....64
MTA1163-HRG.....52	MTAN1254-11I.....76	MTAN4254R-21C.....75	MTBL4410-O.....64
MTA1163-YG.....52	MTAN1254-21A.....75	MTAN6220-42.....79	MTBL4411-HR.....62
MTA1164-HRG.....53	MTAN1254-21C.....75	MTAN6220-52.....79	MTBL4412-HR.....62
MTA1164-YG.....53	MTAN2112-11A.....77	MTAN6524-AHRG.....80	MTBL4413-HR.....62
MTA1188-R.....61	MTAN2112-21C.....77	MTAN6624-CHRG.....80	MTBL4414-HR.....62
MTA1188-RG.....61	MTAN2120-AG.....78	MTAN7112-11A.....77	MTBL5410-RG.....64
MTA2050-R.....56	MTAN2120-CG.....78	MTAN7112-21C.....77	MTBL7410-UR.....64
MTA2063-G.....52	MTAN2123-11A.....78	MTAN7120-AUR.....78	MTBL7411-UR.....62
MTA2063-HR.....52	MTAN2123-21C.....78	MTAN7120-CUR.....78	MTBL7412-UR.....62
MTA2063-Y.....52	MTAN2135-AG.....77	MTAN7123-11A.....78	MTBL7413-UR.....62
MTA2064-G.....53	MTAN2135-CG.....77	MTAN7123-21C.....78	MTBL7414-UR.....62
MTA2064-HR.....53	MTAN2139-AG.....74	MTAN7135-AUR.....77	MTBL1150-R.....54
MTA2064-Y.....53	MTAN2139-CG.....74	MTAN7135-CUR.....77	MTLB1175-R.....54
MTA2188-G.....61	MTAN2140-12A.....79	MTAN7139-AUR.....74	MTLB2150-G.....54
MTA2264-HRG.....53	MTAN2140-22C.....79	MTAN7139-CUR.....74	MTLB2175-G.....54
MTA2264-YG.....53	MTAN2254-11A.....75	MTAN7140-12A.....79	MTLB3150-Y.....54
MTA2572-HRG.....60	MTAN2254-11C.....75	MTAN7140-22C.....79	MTLB3175-Y.....54
MTA2572-YG.....60	MTAN2254-11I.....76	MTAN7254-11A.....75	MTLB4150-HR.....54
MTA3010-G.....57	MTAN2254-21A.....75	MTAN725411C.....75	MTLB4150-O.....54
MTA3010-R.....57	MTAN2254-21C.....75	MTAN7254-21A.....75	MTLB4175-HR.....54
MTA3010-Y.....57	MTAN4112-11A.....77	MTAN7254-21C.....75	MTLB4175-O.....54
MTA3188-Y.....61	MTAN4112-21C.....77	MTAN8826-CHRG.....80	MTLB5058-G.....55
MTA4050-Y.....56	MTAN4112R-11A.....77	MTB5000-G.....58	MTLB5058-HR.....55
MTA4064-G.....53	MTAN4112R-21C.....77	MTB5000-HR.....58	MTLB5058-Y.....55
MTA4064-HR.....53	MTAN4120-AHR.....78	MTB5000-O.....58	MTLB5083-G.....55
MTA4064-Y.....53	MTAN4120-AO.....78	MTB5000-R.....58	MTLB5083-HR.....55
MTA4118-HR.....61	MTAN4120-CHR.....78	MTB5000-RG.....58	MTLB5083-Y.....55
MTA4188-O.....61	MTAN4120-CO.....78	MTB5000-Y.....58	MTLB5087-G.....55
MTA4320-HRG.....59	MTAN4123-11A.....78	MTB10000-G.....58	MTLB5087-HR.....55
MTA4320-YG.....59	MTAN4123-21C.....78	MTB10000-HR.....58	MTLB5087-Y.....55
MTA5050-G.....56	MTAN4123R-11A.....78	MTB10000-O.....58	MTLB5150-RG.....54
MTA7020-G.....59	MTAN4123R-21C.....78	MTB10000-R.....58	MTLB5175-RG.....54
MTA7020-HR.....59	MTAN4135-AHR.....77	MTB10000-RG.....58	MTN1123-ASR.....68
MTA7020-Y.....59	MTAN4135-AO.....77	MTB10000-Y.....58	MTN1123-CSR.....68
MTA7072-G.....60	MTAN4135-CHR.....77	MTBLA411-O.....62	MTN1126-ASR.....67
MTA7072-HR.....60	MTAN4135-CO.....77	MTBLA412-O.....62	MTN1126-CSR.....67
MTA7072-Y.....60	MTAN4139-AHR.....74	MTBLA413-O.....62	MTN1130-ASR.....65

# ALPHA NUMERIC LISTING

MTN1130-CSR.....65	MTN2256-CG.....70	MTN4156-CO.....66	MTN7156-CUR.....66
MTN1141-ASR.....68	MTN2280-AG.....71	MTN4180-AHR.....67	MTN7180-AUR.....67
MTN1141-CSR.....68	MTN2280-CG.....71	MTN4180-AO.....67	MTN7180-CUR.....67
MTN1143-ASR.....65	MTN2356-11I.....73	MTN4180-CHR.....67	MTN7230-AUR.....69
MTN1143-CSR.....65	MTN2356-AG.....71	MTN4180-CO.....67	MTN7230-CUR.....69
MTN1150-ASR.....66	MTN2356-CG.....71	MTN4240-11A.....69	MTN7240-11A.....69
MTN1150-CSR.....66	MTN2428-CG.....72	MTN4240R-11A.....69	MTN7250-AUR.....70
MTN1156-ASR.....66	MTN2456-11A.....72	MTN4250-AHR.....70	MTN7250-CUR.....70
MTN1156-CSR.....66	MTN2456-11C.....72	MTN4250-AO.....70	MTN7256-AUR.....70
MTN1180-ASR.....67	MTN3030-ASR.....69	MTN4250-CHR.....70	MTN7256-CUR.....70
MTN1180-CSR.....67	MTN3031-CSR.....69	MTN4250-CO.....70	MTN7280-AUR.....71
MTN1240-11A.....69	MTN3032-AG.....69	MTN4256-AHR.....70	MTN7280-CUR.....71
MTN1250-ASR.....70	MTN3033-CG.....69	MTN4256-AO.....70	MTN7356-AUR.....71
MTN1250-CSR.....70	MTN3036-AHR.....69	MTN4256-CHR.....70	MTN7356-CUR.....71
MTN1256-ASR.....70	MTN3036-AO.....69	MTN4256-CO.....70	MTN7428-CUR.....72
MTN1256-CSR.....70	MTN3037-CHR.....69	MTN4280-AHR.....71	MTN7456-11A.....72
MTN1280-ASR.....71	MTN3037-CO.....69	MTN4280-AO.....71	MTN7456-11C.....72
MTN1280-CSR.....71	MTN4123-AHR.....68	MTN4280-CHR.....71	MTSM2015-R.....41
MTN1356-11I.....73	MTN4123-AO.....68	MTN4280-CO.....71	MTSM3015-HR.....41
MTN1356-ASR.....71	MTN4123-CHR.....68	MTN4356-11I.....73	MTSM3415-HRY.....41
MTN1356-CSR.....71	MTN4123-CO.....68	MTN4356-AHR.....71	MTSM3515-HRG.....41
MTN1428-CSR.....72	MTN4126-AHR.....67	MTN4356-AO.....71	MTSM4015-Y.....41
MTN1456-11A.....72	MTN4126-AO.....67	MTN4356-CHR.....71	MTSM4515-YG.....41
MTN1456-11C.....72	MTN4126-CHR.....67	MTN4356-CO.....71	MTSM5015-G.....41
MTN2123-AG.....68	MTN4126-CO.....67	MTN4356R-11I.....73	OPC5551.....81
MTN2123-CG.....68	MTN4130-AHR.....65	MTN4428-CHR.....72	OPC5651.....81
MTN2126-AG.....67	MTN4130-AO.....65	MTN4428-CO.....72	OPC5681.....81
MTN2126-CG.....67	MTN4130-CHR.....65	MTN4456-11A.....72	OPC5851.....81
MTN2130-AG.....65	MTN4130-CO.....65	MTN4456-11C.....72	OPC6151.....81
MTN2130-CG.....65	MTN4141-AHR.....68	MTN4456R-11A.....72	OPC6301.....81
MTN2141-AG.....68	MTN4141-AO.....68	MTN4456R-11C.....72	OPC6551.....81
MTN2141-CG.....68	MTN4141-CHR.....68	MTN7123-AUR.....68	OPC6601.....81
MTN2143-AG.....65	MTN4141-CO.....68	MTN7123-CUR.....68	OPC6602.....81
MTN2143-CG.....65	MTN4143-AHR.....65	MTN7126-AUR.....67	OPC6603.....81
MTN2150-AG.....66	MTN4143-AO.....65	MTN7126-CUR.....67	OPC6604.....81
MTN2150-CG.....66	MTN4143-CHR.....65	MTN7130-AUR.....65	OPC6605.....81
MTN2156-AG.....66	MTN4143-CO.....65	MTN7130-CUR.....65	OPC6606.....81
MTN2156-CG.....66	MTN4150-AHR.....66	MTN7141-AUR.....68	OPC6607.....81
MTN2180-AG.....67	MTN4150-AO.....66	MTN7141-CUR.....68	OPC6608.....81
MTN2180-CG.....67	MTN4150-CHR.....66	MTN7143-AUR.....65	OPC6609.....81
MTN2240-11A.....69	MTN4150-CO.....66	MTN7143-CUR.....65	OPC6610.....81
MTN2250-AG.....70	MTN4156-AHR.....66	MTN7150-AUR.....66	OPC7001.....81
MTN2250-CG.....70	MTN4156-AO.....66	MTN7150-CUR.....66	OPC7002.....81
MTN2256-AG.....70	MTN4156-CHR.....66	MTN7156-AUR.....66	



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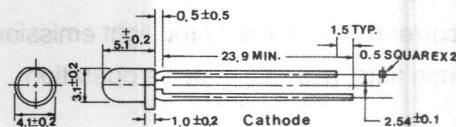
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# T-1 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- All plastic mold type
- Low drive current, high intensity red light emission
- Excellent on/off contrast ratio
- Applications include panel circuit indicators and lighted switches



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT7103-UR	30	4	70	-25~+85	-25~+100
MT7203-UR	30	4	70	-25~+85	-25~+100
MT7303-UR	30	4	70	-25~+85	-25~+100
MT7403-UR	30	4	70	-25~+85	-25~+100
MT7103A-UR	30	4	70	-25~+85	-25~+100
MT7203A-UR	30	4	70	-25~+85	-25~+100
MT7303A-UR	30	4	70	-25~+85	-25~+100
MT7403A-UR	30	4	70	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT7103-UR	GaAlAs/GaAs	Red Diff	54°	35	88	20	1.7	2.2	20	100	4	660
MT7203-UR	GaAlAs/GaAs	White Diff	54°	35	88	20	1.7	2.2	20	100	4	660
MT7303-UR	GaAlAs/GaAs	Water Clear	46°	120	300	20	1.7	2.2	20	100	4	660
MT7403-UR	GaAlAs/GaAs	Red Clear	46°	120	300	20	1.7	2.2	20	100	4	660
MT7103A-UR	GaAlAs	Red Diff	54°	70	176	20	1.7	2.2	20	100	4	660
MT7203A-UR	GaAlAs	White Diff	54°	70	176	20	1.7	2.2	20	100	4	660
MT7303A-UR	GaAlAs	Water Clear	46°	240	600	20	1.7	2.2	20	100	4	660
MT7403A-UR	GaAlAs	Red Clear	46°	240	600	20	1.7	2.2	20	100	4	660

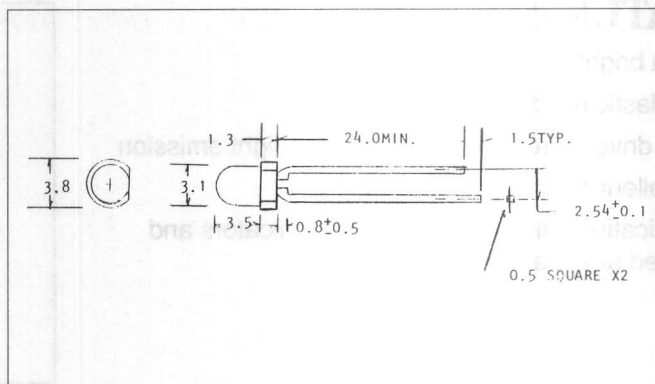


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# T-1 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- All plastic mold
- Low drive current, high intensity red light emission
- Fast response time, capable of pulse operation



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT230-CUR	30	4	70	-25~+85	-25~+100
MT240-CUR	30	4	70	-25~+85	-25~+100
MT250-CUR	30	4	70	-25~+85	-25~+100
MT230A-UR	30	4	70	-25~+85	-25~+100
MT240A-UR	30	4	70	-25~+85	-25~+100
MT250A-UR	30	4	70	-25~+85	-25~+100
MT260A-UR	30	4	70	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT230-CUR	GaAlAs/GaAs	Red Clear	60°	-	135	20	1.7	2.2	20	100	4	660
MT240-CUR	GaAlAs/GaAs	Red Diff	75°	-	85	20	1.7	2.2	20	100	4	660
MT250-CUR	GaAlAs/GaAs	Water Clear	60°	-	115	20	1.7	2.2	20	100	4	660
MT230A-UR	GaAlAs	Red Clear	60°	-	470	20	1.7	2.2	20	100	4	660
MT240A-UR	GaAlAs	Red Diff	75°	-	190	20	1.7	2.2	20	100	4	660
MT250A-UR	GaAlAs	Water Clear	65°	-	345	20	1.7	2.2	20	100	4	660
MT260A-UR	GaAlAs	White Diff	75°	-	160	20	1.7	2.2	20	100	4	660



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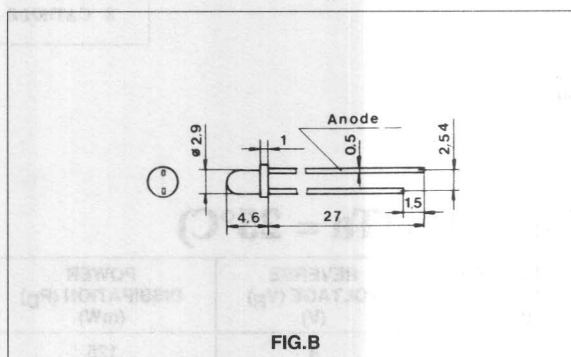
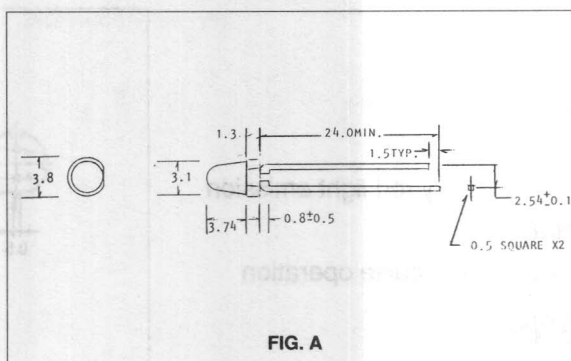
# T-1 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- Low drive current, high intensity
- Excellent on/off contrast ratio

## APPLICATIONS

- Panel circuit indicator
- Lighted switches



## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT600-CUR	30	4	70	-25~+85	-25~+100
A	MT600-CUG	30	5	85	-25~+85	-25~+100
B	MT4093B-UG	25	5	105	-50~+100	-50~+100
B	MT4093E-UR	30	5	100	-50~+100	-50~+100
B	MT4193B-UG	25	5	105	-50~+100	-50~+100
B	MT4193E-UR	30	5	100	-50~+100	-50~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	
A	MT600-CUR	GaAlAs	Water Clear	10°	-	300	20	1.7	2.2	20	100	4	660
A	MT600-CUG	GaP	Water Clear	10°	-	150	20	2.1	3.0	20	100	5	567
B	MT4093B-UG	GaP/GaP	Green Diff	120°	50	60	20	2.2	2.5	20	10	5	565
B	MT4093E-UR	GaAlAs	Red Diff	120°	200	300	20	1.85	2.5	20	10	5	660
B	MT4193B-UG	GaP/GaP	Water Clear	30°	200	300	20	2.2	2.5	20	10	5	565
B	MT4193E-UR	GaAlAs	Water Clear	30°	700	1000	20	1.85	2.5	20	10	5	660

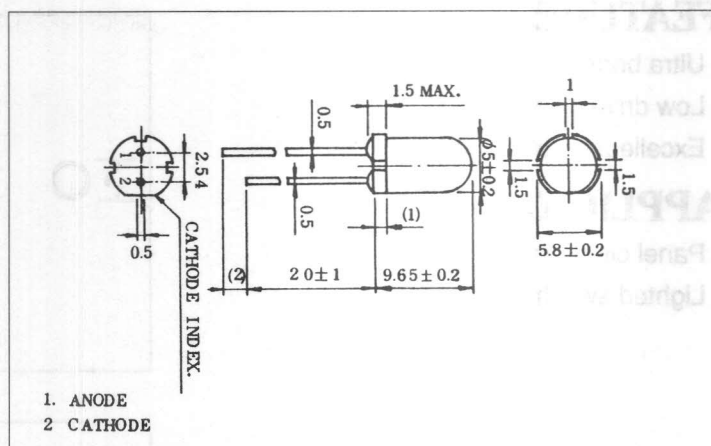
# T - 1 3/4 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- All plastic mold type
- Colorless clear lens
- Low drive current, high intensity red light emission
- Excellent on/off contrast ratio
- Fast response time, capable of pulse operation

## APPLICATIONS

- Panel circuit indicator
- Lighted switches
- Bar code scanner
- Measuring equipment



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT5000-UR	50	4	125	-20~+85	-30~+100
MT4000-UR	50	4	125	-20~+85	-30~+100
MT3200-UR	50	4	125	-20~+85	-30~+100
MT1600-UR	50	4	125	-20~+85	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)
				typ.	min.	typ.	max. @mA	typ.	max.	@mA	μA	Vr		
MT5000-UR	GaAlAs	Water Clear	12°	4000	5000	-	20	1.8	2.4	20	100	4	660	25
MT4000-UR	GaAlAs	Water Clear	12°	2500	3700	5000	20	1.8	2.4	10	100	4	660	25
MT3200-UR	GaAlAs	Water Clear	12°	1600	2400	3200	20	1.8	2.4	10	100	4	660	25
MT1600-UR	GaAlAs	Water Clear	12°	1000	1600	2000	20	1.8	2.4	10	100	4	660	25



# T-1 3/4 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- Low drive current, high intensity red light emission
- Excellent on/off contrast ratio
- Fast response time, capable of pulse operation

## APPLICATIONS

- Panel circuit indicator
- Moving message signs

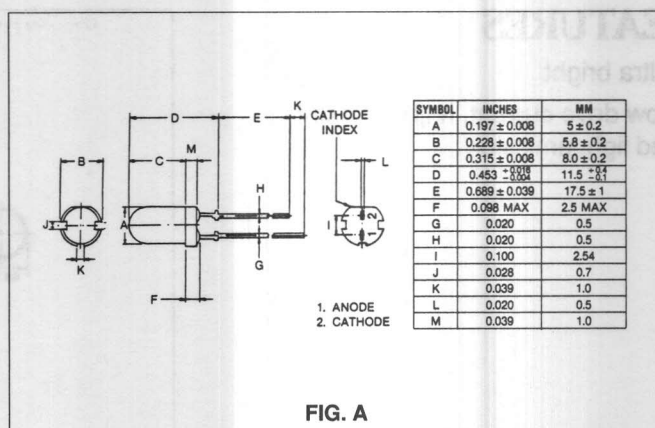


FIG. A

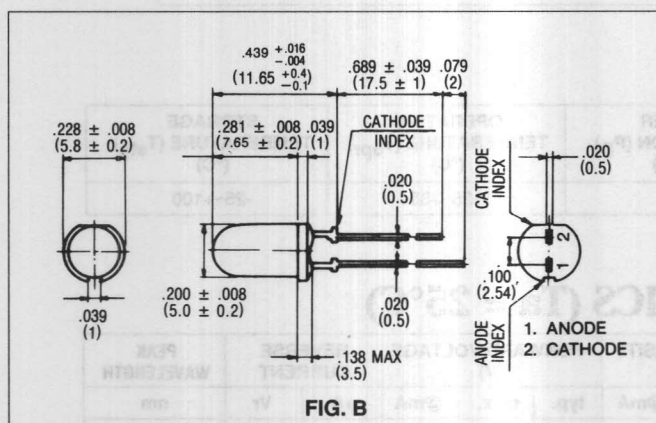


FIG. B

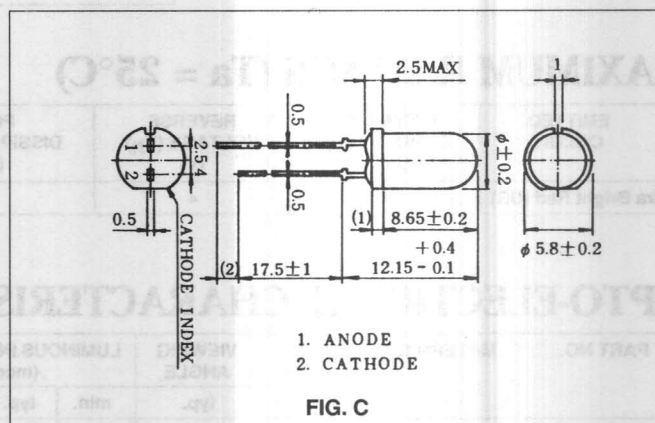


FIG. C

## MAXIMUM RATINGS (Ta = 25°C)

EMITTED COLOR	FORWARD CURRENT (IF) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
Ultra Bright Red (UR)	50	4	125	-20~+85	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH nm	SPEC LINE HALF WIDTH nm
				typ.	min.	typ.	max.	@mA	typ.	max.	@mA	μA	Vr		
A	MT250-UR	GaAlAs	Red Diff	50°	-	250	-	20	1.8	2.4	20	100	4	660	25
A	MT150-UR	GaAlAs	Red Diff	50°	-	150	-	20	1.8	2.4	20	100	4	660	25
A	MT100-UR	GaAlAs	Red Diff	50°	60	100	-	20	1.8	2.4	20	100	4	660	25
B	MT60-UR	GaAlAs	White Diff	60°	32	70	112	20	1.8	2.4	20	100	4	660	25
B	MT120-UR	GaAlAs	White Diff	60°	56	125	200	20	1.8	2.4	20	100	4	660	25
B	MT900-UR	GaAlAs	Water Clear	40°	650	900	-	20	1.8	2.4	20	100	4	660	25
B	MT300-UR	GaAlAs	Water Clear	40°	350	600	900	20	1.8	2.4	20	100	4	660	25
B	MT300-UR	GaAlAs	Water Clear	40°	200	300	500	20	1.8	2.4	20	100	4	660	25
C	MT2500-UR	GaAlAs	Water Clear	15°	-	2500	-	20	1.8	2.4	20	100	4	660	25
C	MT1500-UR	GaAlAs	Water Clear	15°	-	1500	-	20	1.8	2.4	20	100	4	660	25
C	MT800-UR	GaAlAs	Water Clear	15°	-	800	-	20	1.8	2.4	20	100	4	660	25



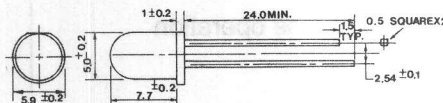
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# T-1 3/4 Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- Low drive current, high intensity red light emission



## MAXIMUM RATINGS (Ta = 25°C)

EMITTED COLOR	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
Ultra Bright Red (UR)	30	4	70	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT7118-UR	GaAlAs	Red Diff	40°	56	140	20		1.7	2.2	20	100	4	660
MT7218-UR	GaAlAs	White Diff	40°	56	140	20		1.7	2.2	20	100	4	660
MT7318-UR	GaAlAs	Water Clear	12°	190	476	20		1.7	2.2	20	100	4	660
MT7418-UR	GaAlAs	Red Clear	12°	190	476	20		1.7	2.2	20	100	4	660
MT7118A-UR	GaAlAs	Red Diff	40°	117	295	20		1.7	2.2	20	100	4	660
MT7218A-UR	GaAlAs	White Diff	40°	117	295	20		1.7	2.2	20	100	4	660
MT7318A-UR	GaAlAs	Water Clear	12°	400	1000	20		1.7	2.2	20	100	4	660
MT7418A-UR	GaAlAs	Red Clear	12°	400	1000	20		1.7	2.2	20	100	4	660

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)	FORWARD VOLTAGE (V)	REVERSE CURRENT (μA)	PEAK WAVELENGTH (nm)
MT7118-UR	GaAlAs	Red Diff	40°	56	1.7	100	660
MT7218-UR	GaAlAs	White Diff	40°	56	1.7	100	660
MT7318-UR	GaAlAs	Water Clear	12°	190	1.7	100	660
MT7418-UR	GaAlAs	Red Clear	12°	190	1.7	100	660
MT7118A-UR	GaAlAs	Red Diff	40°	117	1.7	100	660
MT7218A-UR	GaAlAs	White Diff	40°	117	1.7	100	660
MT7318A-UR	GaAlAs	Water Clear	12°	400	1.7	100	660
MT7418A-UR	GaAlAs	Red Clear	12°	400	1.7	100	660



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## 7

# T-1 3/4 & 10mm Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- Low drive current, high intensity light emission
- Excellent on/off contrast ratio

## MT631 SERIES:

- 10mm ultra bright gumdrop

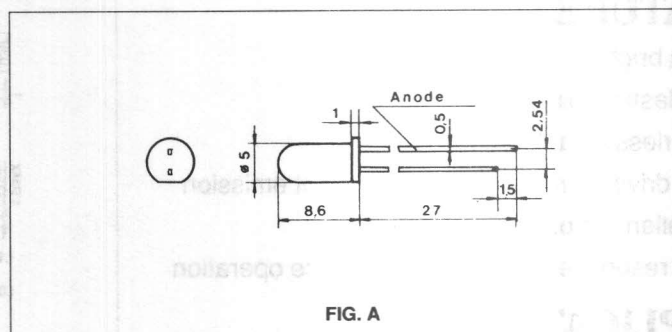


FIG. A

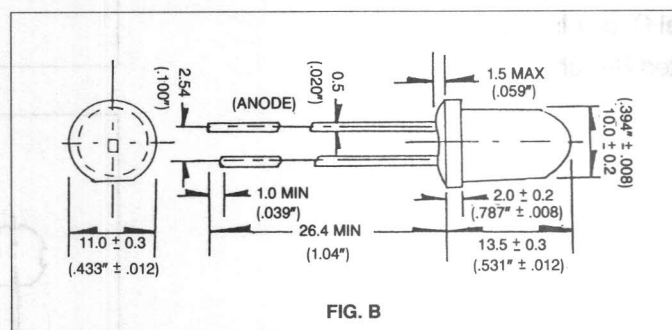


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT305B-SLUG	25	5	105	-50~+100	-50~+100
A	MT305C-SLUR	30	5	100	-50~+100	-50~+100
A	MT305E-SLUR	30	5	100	-50~+100	-50~+100
A	MT315B-SLUG	25	5	105	-50~+100	-50~+100
A	MT315C-SLUR	30	5	100	-50~+100	-50~+100
A	MT315E-SLUR	30	5	100	-50~+100	-50~+100
B	MT631-UR1	40	5	110	-40~+85	-40~+100
B	MT631-UR2	40	5	110	-40~+85	-40~+100
B	MT631-UR3	40	5	110	-40~+85	-40~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH	SPEC. LINE HALF WIDTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm	nm
A	MT305B-SLUG	GaP/GaP	Green Diff	120°	40	50	20	2.2	2.5	20	10	5	565	30
A	MT305C-SLUR	GaAlAs	Red Diff	120°	110	200	20	1.85	2.5	20	10	5	660	20
A	MT305E-SLUR	GaAlAs	Red Diff	120°	300	500	20	1.85	2.5	20	10	5	660	20
A	MT315B-SLUG	GaP/GaP	Water Clear	30°	200	300	20	2.2	2.5	20	10	5	565	30
A	MT315C-SLUR	GaAlAs	Water Clear	30°	510	1000	20	1.85	2.5	20	10	5	660	20
A	MT315E-SLUR	GaAlAs	Water Clear	30°	2000	3500	20	1.85	2.5	20	10	5	660	20
B	MT631-UR1	GaAlAs	Water Clear	8°	400	600	20	1.7	2.4	20	10	5	660	20
B	MT631-UR2	GaAlAs	Water Clear	8°	1000	1200	20	1.7	2.4	20	10	5	660	20
B	MT631-UR3	GaAlAs	Water Clear	8°	2500	3000	20	1.7	2.4	20	10	5	660	20



# T-1 3/4 Tapered Ultra Bright LED Lamps

## FEATURES

- Ultra bright
- All plastic mold type
- Colorless clear lens
- Low drive current, high intensity red light emission
- Excellent on/off contrast ratio
- Fast response time, capable of pulse operation

## APPLICATIONS

- Panel circuit indicator
- Lighted switches

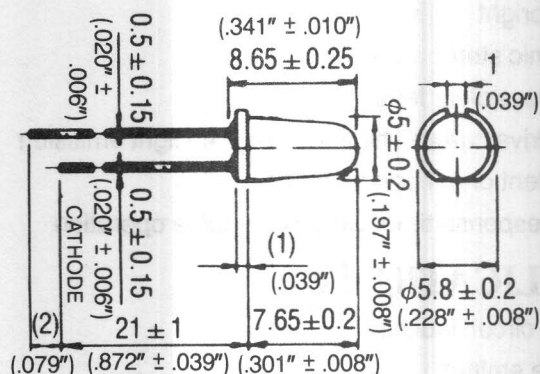


FIG. A

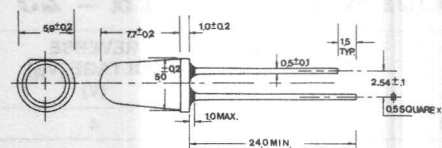


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT1250-UR	50	4	125	-20~+85	-30~+100
A	MT850-UR	50	4	125	-20~+85	-30~+100
A	MT450-UR	50	4	125	-20~+85	-30~+100
B	MT7386-UR	30	4	70	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
A	MT1250-UR	GaAlAs	Water Clear	26°	850	1250	20	1.8	2.4	20	100	4	660
A	MT850-UR	GaAlAs	Water Clear	26°	450	850	20	1.8	2.4	20	100	4	660
A	MT450-UR	GaAlAs	Water Clear	26°	250	450	20	1.8	2.4	20	100	4	660
B	MT7386-UR	GaAlAs	Water Clear	26°	-	1250	20	1.7	2.2	20	100	4	660



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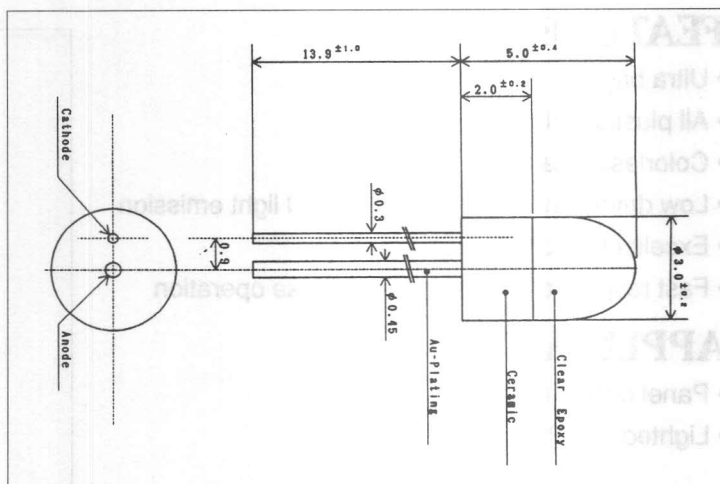
# 3mm Ceramic Stem Ultra Bright LED Emitters

## FEATURES

- Ultra bright
- Ceramic stem
- Colorless clear lens
- Low drive current, high intensity red light emission
- Excellent on/off contrast ratio
- Fast response time, capable of pulse operation

## APPLICATIONS

- Panel circuit indicator
- Visible emitter



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT2500G-UR	30	4	75	-20~+80	-30~+100
MT2500E-UR	30	4	75	-20~+80	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH	SPEC LINE HALF WIDTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm	nm
MT2500G-UR	GaAlAs	Water Clear	8°	-	700	20	1.85	2.2	20	100	4	660	25
MT2500E-UR	GaAlAs	Water Clear	8°	-	500	20	1.85	2.2	20	100	4	660	25



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# Ultra Bright LED Emitters

## FEATURES

- 700 nm GaAlAs ultra bright emitter

### MT80F-UR:

- T - 1 3/4 clear transparent package

### MT85F-UR:

- Metal can accuracy in a plastic package
- Water clear epoxy

## APPLICATIONS

- Optical fiber
- Optical switch
- Photo sensor
- Bar code scanning

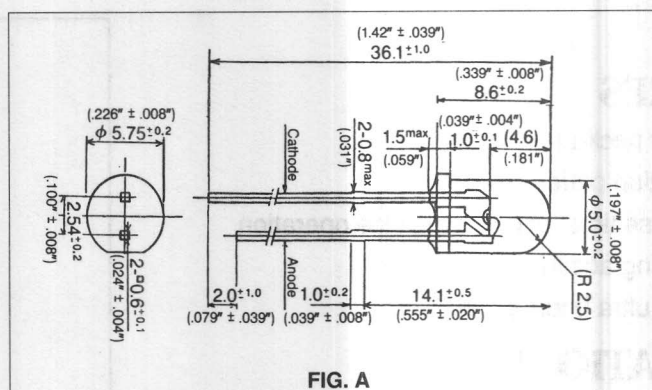


FIG. A

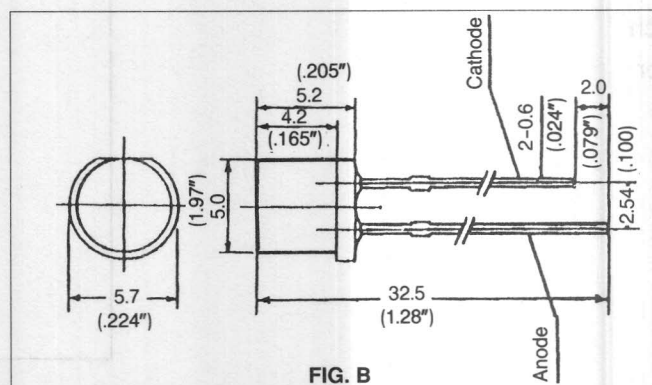


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	PULSE FORWARD CURRENT (I <sub>FP</sub> ) (A)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT80F-UR	50	3	0.5*	120	-20~+80	-30~+100
B	MT85F-UR	50	3	0.5*	120	-20~+80	-30~+100

\* Pulse width = 10μs, Duty = 0.1%

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	POWER OUTPUT (P <sub>O</sub> )			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)	SWITCHING SPEED (10~90%) (nS)			BEAM ANGLE (deg.)
		min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>			T <sub>r</sub>	T <sub>f</sub>	IFP @mA	
A	MT80F-UR	-	2.0	20	1.85	2.2	20	10	3	700	25	80	60	50	26
B	MT85F-UR	1.0	2.0	20	1.85	2.2	20	10	3	700	25	80	60	50	±65



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# Ultra Bright LED Emitters

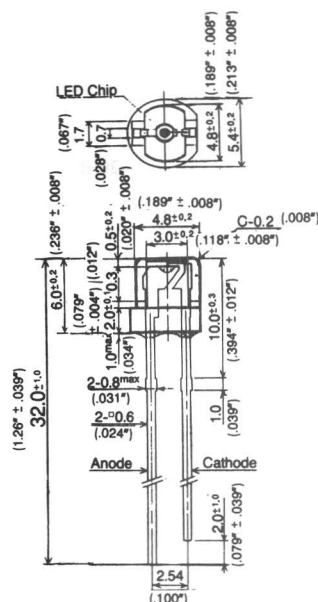
## MT511

### FEATURES

- Water Clear package
- Wider radiation pattern
- Fast response time, capable of pulse operation
- High centering accuracy
- Available in ultra bright green

### APPLICATIONS

- Fiber optics
- Optical switch
- Photo sensor
- Indicator



### MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Forward Current	IF	75	mA
Reverse Voltage	VR	4	V
Power Dissipation	PD	150	mW
Peak Pulse Current	IFP*	0.5	A
Operating Temperature Range	Topr	-30~+85	°C
Storage Temperature Range	Tstg	-30~+100	°C

\*tw=10μs, T=1mS

### MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Forward Voltage	VF	IF=20mA	-	1.8	2.4	V
Reverse Current	IR	VR=4V	-	-	100	μA
Luminous Intensity	IV	IF=20mA	40	100	-	mcd
Peak Wavelength	λp	IF=20mA	-	660	-	nm
Viewing Angle	θ		-	130	-	°
Spectral Line Half Width	Δλ	IF=20mA	-	20	-	nm
Power Output	PO	IF=20mA	1.4	2.8	-	mW
Capacitance	Cj	VF=OV, f=1MHz	-	50	-	pf
Switching Speed	Tr, Tf	IFP=50mA	-	30	-	nS



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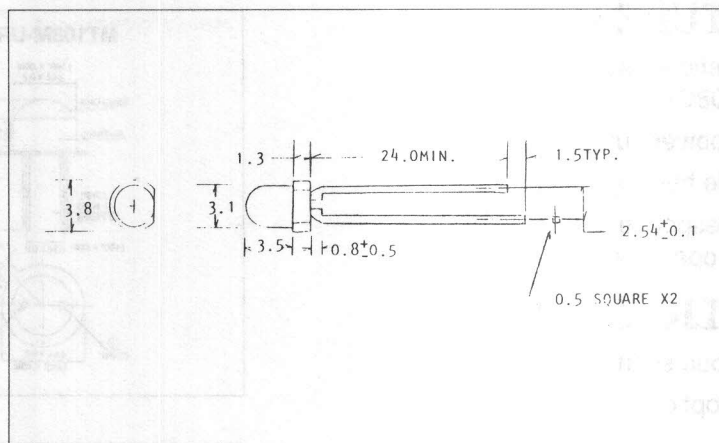


## 13

# Standard T-1 LED Lamps

## FEATURES

- Excellent on/off contrasts
- Wide viewing angle
- Solid state reliability
- Choice of clear or diffused lens
- Available in five colors/materials



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT230-G	30	5	85	-25~+85	-25~+100
MT230-Y	30	5	85	-25~+85	-25~+100
MT230-O	30	5	85	-25~+85	-25~+100
MT230-HR	30	5	85	-25~+85	-25~+100
MT230-UR	30	4	70	-25~+85	-25~+100
MT240-G	30	5	85	-25~+85	-25~+100
MT240-Y	30	5	85	-25~+85	-25~+100
MT240-O	30	5	85	-25~+85	-25~+100
MT240-HR	30	5	85	-25~+85	-25~+100
MT240-UR	30	4	70	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

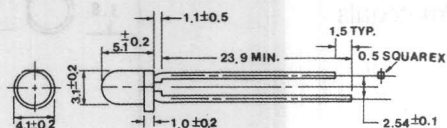
PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max.	@mA	μA	Vr	nm
MT230-G	GaP/GaP	Green Clear	60°	1.0	6.0	10		2.1	3.0	20	100	5	567
MT230-Y	GaAsP/GaP	Yellow Clear	60°	.5	4.0	10		2.1	3.0	20	100	5	585
MT230-O	GaAsP/GaP	Orange Clear	60°	2.5	4.5	10		2.1	3.0	20	100	5	635
MT230-HR	GaAsP/GaP	Red Clear	60°	2.5	4.5	10		2.1	3.0	20	100	5	635
MT230-UR	GaAlAs	Red Clear	60°	5.0	20.0	20		1.7	2.2	20	100	4	660
MT240-G	GaP/GaP	Green Diff	75°	.8	4.0	10		2.1	3.0	20	100	5	567
MT240-Y	GaAsP/GaP	Yellow Diff	75°	.4	2.5	10		2.1	3.0	20	100	5	585
MT240-O	GaAsP/GaP	Orange Diff	75°	1.5	2.5	10		2.1	3.0	20	100	5	635
MT240-HR	GaAsP/GaP	Red Diff	75°	1.5	2.5	10		2.1	3.0	20	100	5	635
MT240-UR	GaAlAs	Red Diff	75°	3.0	10.0	20		1.7	2.2	20	100	4	660



# Standard T-1 LED Lamps

## FEATURES

- Excellent on/off contrasts
- Wide viewing angle
- Solid state reliability
- Choice of clear or diffused lens
- Available in six colors/materials



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1103-R	30	3.0	100	-25~+85	-25~+100
MT1103-RG	30	5.0	85	-25~+85	-25~+100
MT2103-G	30	5.0	85	-25~+85	-25~+100
MT3103-Y	30	5.0	85	-25~+85	-25~+100
MT4103-O	30	5.0	85	-25~+85	-25~+100
MT4103-HR	30	5.0	85	-25~+85	-25~+100
MT1303-R	30	3.0	100	-25~+85	-25~+100
MT1303-RG	30	5.0	85	-25~+85	-25~+100
MT2303-G	30	5.0	85	-25~+85	-25~+100
MT3303-Y	30	5.0	85	-25~+85	-25~+100
MT4303-O	30	5.0	85	-25~+85	-25~+100

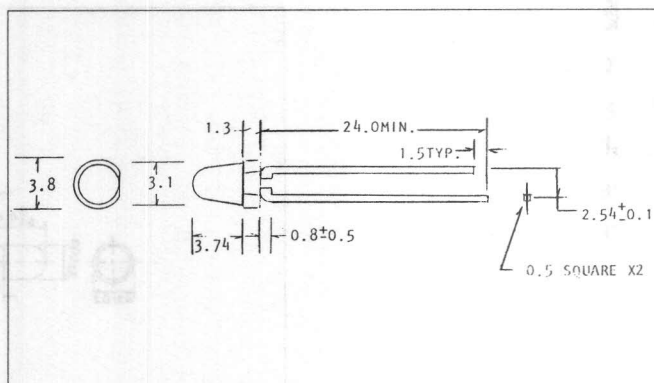
## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max.	@mA	μA	Vr	nm
MT1103-R	GaAsP	Red Diff	74°	0.2	0.5	10		1.7	2.0	20	100	3	655
MT1103-RG	GaP	Red Diff	74°	0.3	0.8	10		2.1	3.0	20	100	5	700
MT2103-G	GaP	Green Diff	74°	1.5	3.7	10		2.1	3.0	20	100	5	567
MT3103-Y	GaAsP/GaP	Yellow Diff	74°	1.2	3.1	10		2.1	3.0	20	100	5	585
MT4103-O	GaAsP/GaP	Orange Diff	74°	1.7	4.3	10		2.1	3.0	20	100	5	635
MT4103-HR	GaAsP/GaP	Red Diff	74°	1.7	4.3	10		2.1	3.0	20	100	5	635
MT1303-R	GaAsP	Water Clear	50°	0.7	1.7	10		1.7	2.0	20	100	3	655
MT1303-RG	GaP	Water Clear	50°	1.1	2.7	10		2.1	3.0	20	100	5	700
MT2303-G	GaP	Water Clear	50°	5.0	12.6	10		2.1	3.0	20	100	5	567
MT3303-Y	GaAsP/GaP	Water Clear	50°	4.2	10.5	10		2.1	3.0	20	100	5	585
MT4303-O	GaAsP/GaP	Water Clear	50°	5.8	14.6	10		2.1	3.0	20	100	5	635

# Tapered T-1 LED Lamps

## FEATURES

- High brightness
- Solid state reliability
- Choice of clear or diffused lens
- Available in five colors/materials



## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
MT630-G	30	5	85	-25~+85	-25~+100
MT630-Y	30	5	85	-25~+85	-25~+100
MT630-O	30	5	85	-25~+85	-25~+100
MT630-HR	30	5	85	-25~+85	-25~+100
MT630-UR	30	4	70	-25~+85	-25~+100
MT640-G	30	5	85	-25~+85	-25~+100
MT640-Y	30	5	85	-25~+85	-25~+100
MT640-O	30	5	85	-25~+85	-25~+100
MT640-HR	30	5	85	-25~+85	-25~+100
MT640-UR	30	4	70	-25~+85	-25~+100

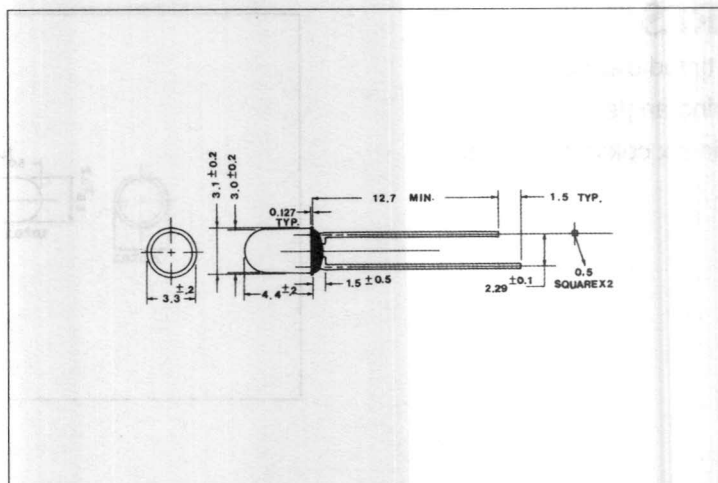
## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	$\mu\text{A}$	$V_r$	nm
MT630-G	GaP/GaP	Green Clear	32°	12.1	30.3	10	2.1	3.0	20	100	5	567
MT630-Y	GaAsP/GaP	Yellow Clear	32°	9.9	24.8	10	2.1	3.0	20	100	5	585
MT630-O	GaAsP/GaP	Orange Clear	32°	14.0	35.0	10	2.1	3.0	20	100	5	635
MT630-HR	GaAsP/GaP	Red Clear	32°	14.0	35.0	10	2.1	3.0	20	100	5	635
MT630-UR	GaAlAs	Red Clear	32°	28.0	70.0	10	1.7	2.2	20	100	4	660
MT640-G	GaP/GaP	Green Diff	38°	3.6	8.7	10	2.1	3.0	20	100	5	567
MT640-Y	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
MT640-O	GaAsP/GaP	Orange Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
MT640-HR	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
MT640-UR	GaAlAs	Red Diff	38°	8.2	20.6	10	1.7	2.2	20	100	4	660

# Standard T-1 LED Lamps

## FEATURES

- Flangeless package
- Diffused lens
- Wide viewing angle
- Available in six colors/materials
- Excellent for use in PCB and panel indicator packages



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1159-R	30	3.0	100	-25~+85	-25~+100
MT1159-RG	30	5.0	85	-25~+85	-25~+100
MT2159-G	30	5.0	85	-25~+85	-25~+100
MT3159-Y	30	5.0	85	-25~+85	-25~+100
MT4159-O	30	5.0	85	-25~+85	-25~+100
MT4159-HR	30	5.0	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
MT1159-R	GaAsP/GaAs	Red Diff	74°	0.2	0.5	10	1.7	2.0	20	100	3	655
MT1159-RG	GaP/GaP	Red Diff	74°	0.3	0.8	10	2.1	3.0	20	100	5	700
MT2159-G	GaP/GaP	Green Diff	74°	1.5	3.7	10	2.1	3.0	20	100	5	567
MT3159-Y	GaAsP/GaP	Yellow Diff	74°	1.2	3.1	10	2.1	3.0	20	100	5	585
MT4159-O	GaAsP/GaP	Orange Diff	74°	1.7	4.3	10	2.1	3.0	20	100	5	635
MT4159-HR	GaAsP/GaP	Red Diff	74°	1.7	4.3	10	2.1	3.0	20	100	5	635



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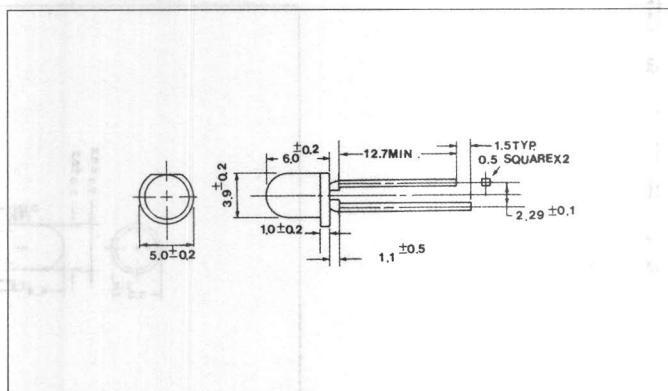
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# 4mm LED Lamp

## FEATURES

- Choice of tinted clear or diffused
- Wide viewing angle
- Available in six colors/materials



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1041-R	30	3	100	-25~+85	-25~+100
MT1041-RG	30	5	85	-25~+85	-25~+100
MT1042-G	30	5	85	-25~+85	-25~+100
MT1043-Y	30	5	85	-25~+85	-25~+100
MT1044-O	30	5	85	-25~+85	-25~+100
MT1044-HR	30	5	85	-25~+85	-25~+100
MT4041-R	30	3	100	-25~+85	-25~+100
MT4041-RG	30	5	85	-25~+85	-25~+100
MT4042-G	30	5	85	-25~+85	-25~+100
MT4043-Y	30	5	85	-25~+85	-25~+100
MT4044-O	30	5	85	-25~+85	-25~+100
MT4044-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	
MT1041-R	GaAsP/GaAs	Red Diff	54°	.2	.5	10	1.7	2.0	20	100	3	655
MT1041-RG	GaP/GaP	Red Diff	54°	.3	.8	10	2.1	3.0	20	100	5	700
MT1042-G	GaP/GaP	Green Diff	54°	1.5	3.7	10	2.1	3.0	20	100	5	567
MT1043-Y	GaAsP/GaP	Yellow Diff	54°	1.2	3.0	10	2.1	3.0	20	100	5	585
MT1044-O	GaAsP/GaP	Orange Diff	54°	1.7	4.3	10	2.1	3.0	20	100	5	635
MT1044-HR	GaAsP/GaP	Red Diff	54°	1.7	4.3	10	2.1	3.0	20	100	5	635
MT4041-R	GaAsP/GaAs	Red Clear	20°	.7	1.7	10	1.7	2.0	20	100	3	655
MT4041-RG	GaP/GaP	Red Clear	20°	1.1	2.7	10	2.1	3.0	20	100	5	700
MT4042-G	GaP/GaP	Green Clear	20°	5.0	12.6	10	2.1	3.0	20	100	5	567
MT4043-Y	GaAsP/GaP	Yellow Clear	20°	4.2	10.5	10	2.1	3.0	20	100	5	585
MT4044-O	GaAsP/GaP	Orange Clear	20°	5.8	14.6	10	2.1	3.0	20	100	5	635
MT4044-HR	GaAsP/GaP	Red Clear	20°	5.8	14.6	10	2.1	3.0	20	100	5	635



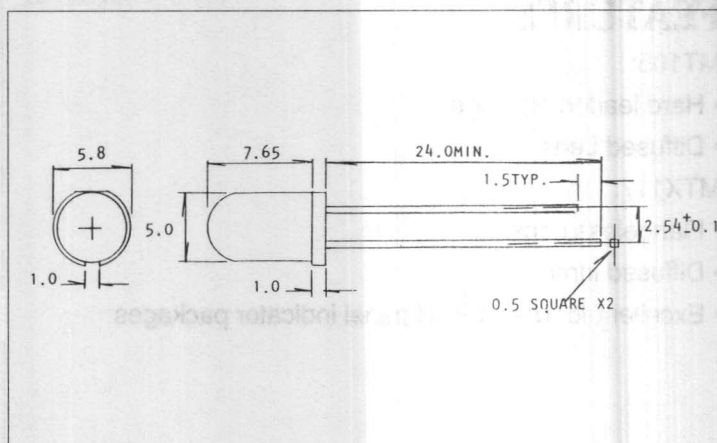
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# Standard T-1 3/4 LED Lamps

## FEATURES

- Excellent on/off contrast ratio
- Available in clear or diffused lens



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
MT130-SLR	30	5	85	-25~+85	-25~+100
MT130-SLG	30	5	85	-25~+85	-25~+100
MT130-SLY	30	5	85	-25~+85	-25~+100
MT130-SLO	30	5	85	-25~+85	-25~+100
MT130-SLHR	30	5	85	-25~+85	-25~+100
MT140-SLR	30	5	85	-25~+85	-25~+100
MT140-SLG	30	5	85	-25~+85	-25~+100
MT140-SLY	30	5	85	-25~+85	-25~+100
MT140-SLO	30	5	85	-25~+85	-25~+100
MT140-SLHR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
MT130-SLR	GaP/GaP	Red Clear	50°	.6	3.5	15	2.1	3.0	20	100	5	700
MT130-SLG	GaP/GaP	Green Clear	50°	3.0	17.0	15	2.1	3.0	20	100	5	567
MT130-SLY	GaAsP/GaP	Yellow Clear	50°	1.0	9.0	15	2.1	3.0	20	100	5	585
MT130-SLO	GaAsP/GaP	Orange Clear	50°	5.0	15.0	15	2.1	3.0	20	100	5	635
MT130-SLHR	GaAsP/GaP	Red Clear	50°	5.0	15.0	15	2.1	3.0	20	100	5	635
MT140-SLR	GaP/GaP	Red Diff	80°	.4	1.5	15	2.1	3.0	20	100	5	700
MT140-SLG	GaP/GaP	Green Diff	80°	.8	5.0	15	2.1	3.0	20	100	5	567
MT140-SLY	GaAsP/GaP	Yellow Diff	80°	.8	5.0	15	2.1	3.0	20	100	5	585
MT140-SLO	GaAsP/GaP	Orange Diff	80°	3.0	7.0	15	2.1	3.0	20	100	5	635
MT140-SLHR	GaAsP/GaP	Red Diff	80°	3.0	7.0	15	2.1	3.0	20	100	5	635



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# Standard T-1 3/4 LED Lamps

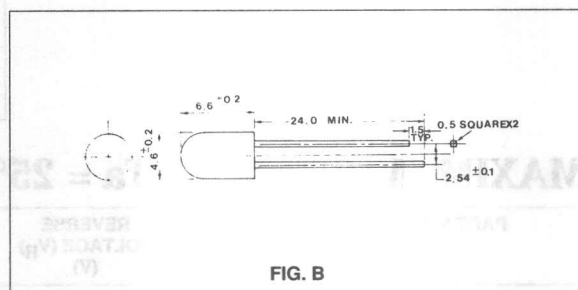
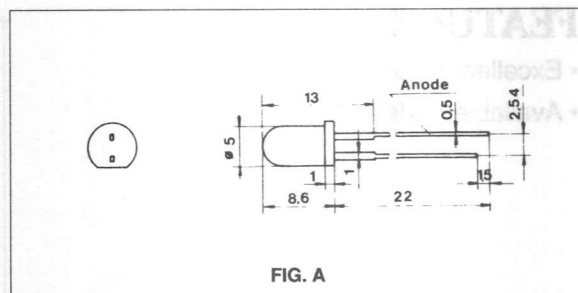
## FEATURES

MT105:

- Hard leaded package
- Diffused Lens

MTX117:

- Flangeless package
- Diffused lens
- Excellent for use in PCB panel indicator packages



## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT105-HLG	25	5	105	-50~+100	-50~+100
A	MT105-HLY	30	5	105	-50~+100	-50~+100
A	MT105-HLHR	30	5	105	-50~+100	-50~+100
B	MT1117-R	30	3	100	-25~+85	-25~+100
B	MT1117-RG	30	5	85	-25~+85	-25~+100
B	MT2117-G	30	5	85	-25~+85	-25~+100
B	MT3117-Y	30	5	85	-25~+85	-25~+100
B	MT4117-O	30	5	85	-25~+85	-25~+100
B	MT4117-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT105-HLG	GaP/GaP	Green Diff	120°	2.0	8.0	10	2.2	2.5	20	10	5	565
A	MT105-HLY	GaAsP/GaP	Yellow Diff	120°	3.2	20.0	10	2.1	2.5	20	10	5	590
A	MT105-HLHR	GaAsP/GaP	Red Diff	120°	3.2	20.0	10	2.0	2.5	20	10	5	625
B	MT1117-R	GaAsP/GaAs	Red Diff	54°	.5	1.2	10	1.7	2.0	20	100	3	655
B	MT1117-RG	GaP/GaP	Red Diff	54°	.7	1.8	10	2.1	3.0	20	100	5	700
B	MT2117-G	GaP/GaP	Green Diff	54°	2.5	3.8	10	2.1	3.0	20	100	5	567
B	MT3117-Y	GaAsP/GaP	Yellow Diff	54°	2.9	7.3	10	2.1	3.0	20	100	5	585
B	MT4117-O	GaAsP/GaP	Orange Diff	54°	4.1	10.3	10	2.1	3.0	20	100	5	635
B	MT4117-HR	GaAsP/GaP	Red Diff	54°	4.1	10.3	10	2.1	3.0	20	100	5	635



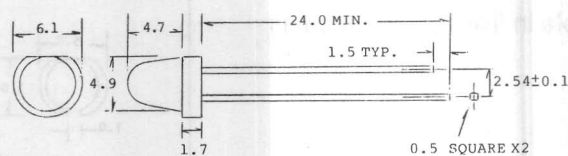
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# Low Profile T-1 3/4 LED Lamps

## FEATURES

- Excellent brightness in a low profile package
- Available in color clear or color diffused



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT430-G	30	5	85	-25~+85	-25~+100
MT430-Y	30	5	85	-25~+85	-25~+100
MT430-O	30	5	85	-25~+85	-25~+100
MT430-HR	30	5	85	-25~+85	-25~+100
MT430-UR	30	4	70	-25~+85	-25~+100
MT440-G	30	5	85	-25~+85	-25~+100
MT440-Y	30	5	85	-25~+85	-25~+100
MT440-O	30	5	85	-25~+85	-25~+100
MT440-HR	30	5	85	-25~+85	-25~+100
MT440-UR	30	4	70	-25~+85	-25~+100

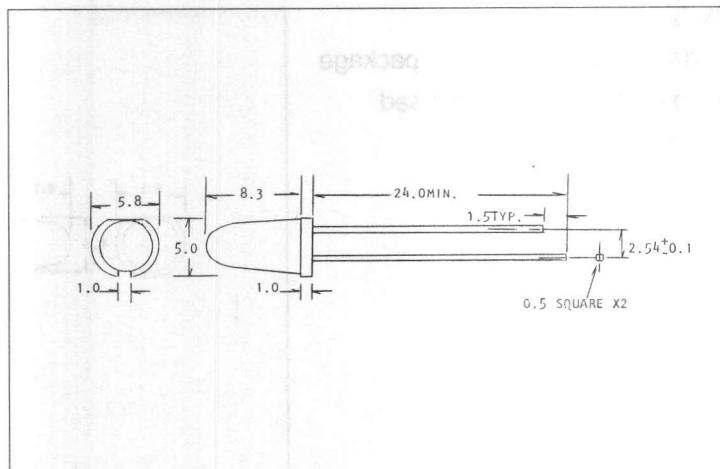
## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT430-G	GaP	Green Clear	32°	17.1	42.8	10	2.1	3.0	20	100	5	567
MT430-Y	GaAsP/GaP	Yellow Clear	32°	14.2	35.4	10	2.1	3.0	20	100	5	585
MT430-O	GaAsP/GaP	Orange Clear	32°	18.8	49.6	10	2.1	3.0	20	100	5	635
MT430-HR	GaAsP/GaP	Red Clear	32°	18.8	49.6	10	2.1	3.0	20	100	5	635
MT430-UR	GaAlAs	Red Clear	32°	-	350	10	1.7	2.2	20	100	4	660
MT440-G	GaP	Green Diff	48°	6.0	12.6	10	2.1	3.0	20	100	5	567
MT440-Y	GaAsP/GaP	Yellow Diff	48°	4.2	10.4	10	2.1	3.0	20	100	5	585
MT440-O	GaAsP/GaP	Orange Diff	48°	5.8	14.6	10	2.1	3.0	20	100	5	635
MT440-HR	GaAsP/GaP	Red Diff	48°	5.8	14.6	10	2.1	3.0	20	100	5	635
MT440-UR	GaAlAs	Red Diff	48°	-	190	10	1.7	2.2	20	100	4	660

# Tapered T-1 3/4 LED Lamps

## FEATURES

- High brightness parts provide excellent backlighting
- Tapered package
- Available in five colors/materials



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT530-R	30	5	85	-25~+85	-25~+100
MT530-G	30	5	85	-25~+85	-25~+100
MT530-Y	30	5	85	-25~+85	-25~+100
MT530-O	30	5	85	-25~+85	-25~+100
MT530-HR	30	5	85	-25~+85	-25~+100
MT540-R	30	5	85	-25~+85	-25~+100
MT540-G	30	5	85	-25~+85	-25~+100
MT540-Y	30	5	85	-25~+85	-25~+100
MT540-O	30	5	85	-25~+85	-25~+100
MT540-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT530-R	GaP/GaP	Red Clear	26°	3.7	7.2	10		2.1	3.0	20	100	5	700
MT530-G	GaP/GaP	Green Clear	26°	18.1	45.2	10		2.1	3.0	20	100	5	567
MT530-Y	GaAsP/GaP	Yellow Clear	26°	16.0	37.4	10		2.1	3.0	20	100	5	585
MT530-O	GaAsP/GaP	Orange Clear	26°	21.1	52.7	10		2.1	3.0	20	100	5	635
MT530-HR	GaAsP/GaP	Red Diff	26°	21.1	52.7	10		2.1	3.0	20	100	5	635
MT540-R	GaP/GaP	Red Diff	32°	1.1	2.7	10		2.1	3.0	20	100	5	700
MT540-G	GaP/GaP	Green Diff	32°	5.3	13.3	10		2.1	3.0	20	100	5	567
MT540-Y	GaAsP/GaP	Yellow Diff	32°	4.4	11.0	10		2.1	3.0	20	100	5	585
MT540-O	GaAsP/GaP	Orange Diff	32°	6.2	15.5	10		2.1	3.0	20	100	5	635
MT540-HR	GaAsP/GaP	Red Diff	32°	6.2	15.5	10		2.1	3.0	20	100	5	635



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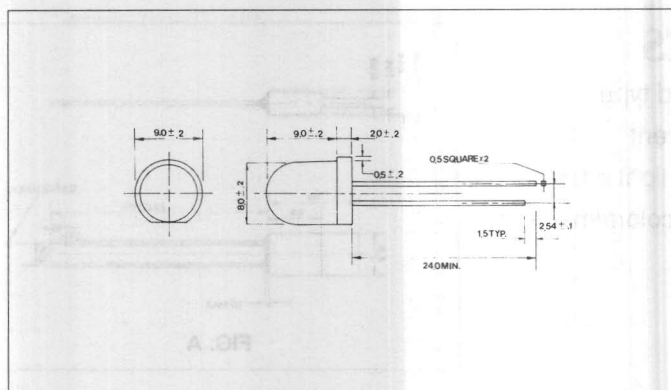
# 8mm LED Lamp

## FEATURES

- Choice of diffused or tinted clear lens

## APPLICATIONS

- Outdoor backlighting
- Large area backlighting
- Moving message signs



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1498-R	30	3	100	-25~+85	-25~+100
MT1498-RG	30	5	85	-25~+85	-25~+100
MT2498-G	30	5	85	-25~+85	-25~+100
MT3498-Y	30	5	85	-25~+85	-25~+100
MT4498-O	30	5	85	-25~+85	-25~+100
MT4498-HR	30	5	85	-25~+85	-25~+100
MT1198-R	30	3	100	-25~+85	-25~+100
MT1198-RG	30	5	85	-25~+85	-25~+100
MT2198-G	30	5	85	-25~+85	-25~+100
MT3198-Y	30	5	85	-25~+85	-25~+100
MT4198-O	30	5	85	-25~+85	-25~+100
MT4198-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
			typ.									
MT1498-R	GaAsP/GaAs	Red Clear	32°	1.6	4.1	10	1.7	2.0	20	100	3	655
MT1498-RG	GaP/GaP	Red Clear	32°	2.5	6.1	10	2.1	3.0	20	100	5	700
MT2498-G	GaP/GaP	Green Clear	32°	12.1	36.3	10	2.1	3.0	20	100	5	567
MT3498-Y	GaAsP/GaP	Yellow Clear	32°	9.4	24.8	10	2.1	3.0	20	100	5	585
MT4498-O	GaAsP/GaP	Orange Clear	32°	14	35	10	2.1	3.0	20	100	5	635
MT4498-HR	GaAsP/GaP	Red Clear	32°	14	35	10	2.1	3.0	20	100	5	635
MT1198-R	GaAsP/GaP	Red Diff	40°	.5	1.2	10	1.7	2.0	20	100	3	655
MT1198-RG	GaP/GaP	Red Diff	40°	.7	1.8	10	2.1	3.0	20	100	5	700
MT2198-G	GaP/GaP	Green Diff	40°	3.6	8.9	10	2.1	3.0	20	100	5	567
MT3198-Y	GaAsP/GaP	Yellow Diff	40°	2.9	7.3	10	2.1	3.0	20	100	5	585
MT4198-O	GaAsP/GaP	Orange Diff	40°	4.1	10.3	10	2.1	3.0	20	100	5	635
MT4198-HR	GaAsP/GaP	Red Diff	40°	4.1	10.3	10	2.1	3.0	20	100	5	635



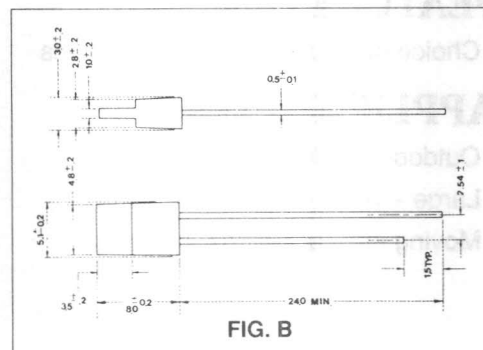
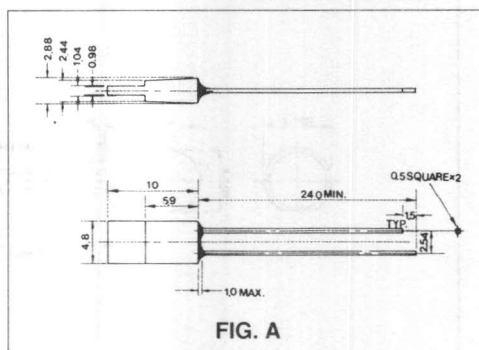
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# 1x5mm Rectangular LED Lamps

## FEATURES

- All plastic mold type
- Low drive current
- High intensity light emission
- Choice of six colors/materials



## MAXIMUM RATINGS (TA = 25°C)

FIG	PART NO.	FORWARD CURRENT (IF) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT1146-R	30	3.0	100	-25~+85	-25~+100
A	MT1146-RG	30	5.0	85	-25~+85	-25~+100
A	MT2146-G	30	5.0	85	-25~+85	-25~+100
A	MT3146-Y	30	5.0	85	-25~+85	-25~+100
A	MT4146-O	30	5.0	85	-25~+85	-25~+100
A	MT4146-HR	30	5.0	85	-25~+85	-25~+100
B	MT1194-R	30	3.0	100	-25~+85	-25~+100
B	MT1194-RG	30	5.0	85	-25~+85	-25~+100
B	MT2194-G	30	5.0	85	-25~+85	-25~+100
B	MT3194-Y	30	5.0	85	-25~+85	-25~+100
B	MT4194-O	30	5.0	85	-25~+85	-25~+100
B	MT4194-HR	30	5.0	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (TA = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	
A	MT1146-R	GaAsP/GaAs	Red Diff	80°	.3	.8	10	1.7	2.0	20	100	3	655
A	MT1146-RG	GaP/GaP	Red Diff	80°	.5	1.2	10	2.1	3.0	20	100	5	700
A	MT2146-G	GaP/GaP	Green Diff	80°	1.2	3.1	10	2.1	3.0	20	100	5	567
A	MT3146-Y	GaAsP/GaP	Yellow Diff	80°	1.0	2.6	10	2.1	3.0	20	100	5	585
A	MT4146-O	GaAsP/GaP	Orange Diff	80°	1.4	3.6	10	2.1	3.0	20	100	5	635
A	MT4146-HR	GaAsP/GaP	Red Diff	80°	1.4	3.6	10	2.1	3.0	20	100	5	635
B	MT1194-R	GaAsP/GaAs	Red Diff	80°	.3	.8	10	1.7	2.0	20	100	3	655
B	MT1194-RG	GaP/GaP	Red Diff	80°	.5	1.2	10	2.1	3.0	20	100	5	700
B	MT2194-G	GaP/GaP	Green Diff	80°	1.2	3.1	10	2.1	3.0	20	100	5	567
B	MT3194-Y	GaAsP/GaP	Yellow Diff	80°	1.0	2.6	10	2.1	3.0	20	100	5	585
B	MT4194-O	GaAsP/GaP	Orange Diff	80°	1.4	3.6	10	2.1	3.0	20	100	5	635
B	MT4194-HR	GaAsP/GaP	Red Diff	80°	1.4	3.6	10	2.1	3.0	20	100	5	635



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# 1.75x4mm/2x4mm Rectangular LED Lamps

## FEATURES

- All plastic mold type
- Low drive current
- High intensity light emission
- Choice of six colors/materials

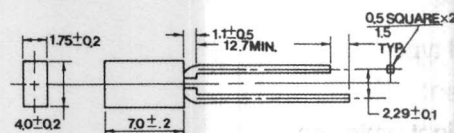


FIG. A 1.75 x 4 mm

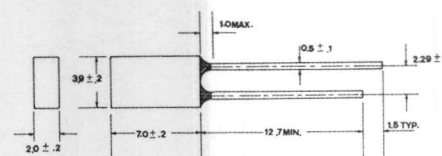


FIG. B 2 x 4 mm

## MAXIMUM RATINGS (TA = 25°C)

FIG	PART NO.	FORWARD CURRENT (IF) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT1116-R	30	3.0	100	-25~+85	-25~+100
A	MT1116-RG	30	5.0	85	-25~+85	-25~+100
A	MT2116-G	30	5.0	85	-25~+85	-25~+100
A	MT3116-Y	30	5.0	85	-25~+85	-25~+100
A	MT4116-O	30	5.0	85	-25~+85	-25~+100
A	MT4116-HR	30	5.0	85	-25~+85	-25~+100
B	MT1189-R	30	3.0	100	-25~+85	-25~+100
B	MT1189-RG	30	5.0	85	-25~+85	-25~+100
B	MT2189-G	30	5.0	85	-25~+85	-25~+100
B	MT3189-Y	30	5.0	85	-25~+85	-25~+100
B	MT4189-O	30	5.0	85	-25~+85	-25~+100
B	MT4189-HR	30	5.0	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (TA = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	
A	MT1116-R	GaAsP/GaAs	Red Diff	74°	.2	.6	10	1.7	2.0	20	100	3	655
A	MT1116-RG	GaP/GaP	Red Diff	74°	.4	.9	10	2.1	3.0	20	100	5	700
A	MT2116-G	GaP/GaP	Green Diff	74°	1.0	2.4	10	2.1	3.0	20	100	5	567
A	MT3116-Y	GaAsP/GaP	Yellow Diff	74°	.8	1.9	10	2.1	3.0	20	100	5	585
A	MT4116-O	GaAsP/GaP	Orange Diff	74°	1.1	2.7	10	2.1	3.0	20	100	5	635
A	MT4116-HR	GaAsP/GaP	Red Diff	74°	1.1	2.7	10	2.1	3.0	20	100	5	635
B	MT1189-R	GaAsP/GaAs	Red Diff	82°	.3	.8	10	1.7	2.0	20	100	3	655
B	MT1189-RG	GaP/GaP	Red Diff	82°	.5	1.2	10	2.1	3.0	20	100	5	700
B	MT2189-G	GaP/GaP	Green Diff	82°	1.2	3.1	10	2.1	3.0	20	100	5	567
B	MT3189-Y	GaAsP/GaP	Yellow Diff	82°	1.0	2.6	10	2.1	3.0	20	100	5	585
B	MT4189-O	GaAsP/GaP	Orange Diff	82°	1.4	3.6	10	2.1	3.0	20	100	5	635
B	MT4189-HR	GaAsP/GaP	Red Diff	82°	1.4	3.6	10	2.1	3.0	20	100	5	635



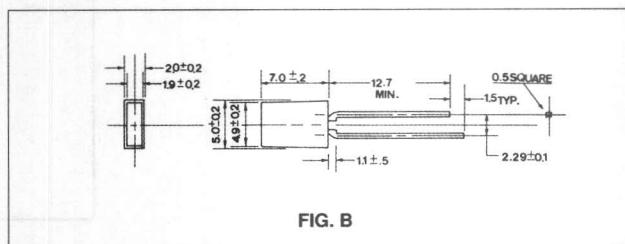
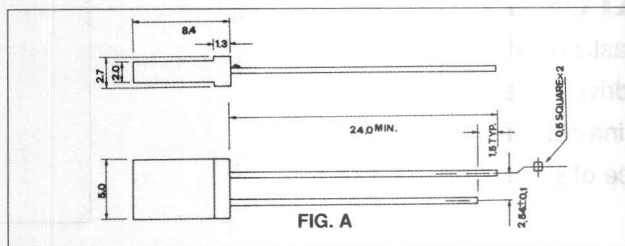
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## 2x5mm Rectangular LED Lamps

## FEATURES

- All plastic mold type
- Low drive current
- High intensity light emission
- Choice of six colors/materials



### MAXIMUM RATINGS (Ta = 25°C)

F I G	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT1123-R	30	3.0	100	-25~+85	-25~+100
A	MT1123-RG	30	5.0	85	-25~+85	-25~+100
A	MT2123-G	30	5.0	85	-25~+85	-25~+100
A	MT3123-Y	30	5.0	85	-25~+85	-25~+100
A	MT4123-O	30	5.0	85	-25~+85	-25~+100
A	MT4123-HR	30	5.0	85	-25~+85	-25~+100
B	MT1130-R	30	3.0	100	-25~+85	-25~+100
B	MT1130-RG	30	5.0	85	-25~+85	-25~+100
B	MT2130-G	30	5.0	85	-25~+85	-25~+100
B	MT3130-Y	30	5.0	85	-25~+85	-25~+100
B	MT4130-O	30	5.0	85	-25~+85	-25~+100
B	MT4130-HR	30	5.0	85	-25~+85	-25~+100

### OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

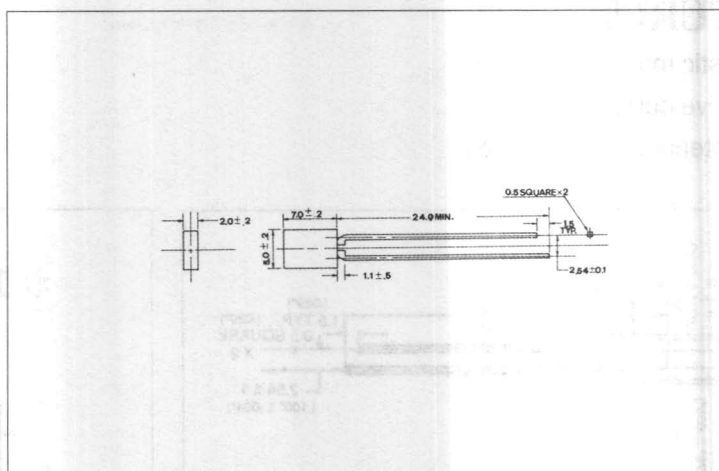
FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT1123-R	GaAsP/GaAs	Red Diff	72°	.2	.5	10	1.7	2.0	20	100	3	655
A	MT1123-RG	GaP/GaP	Red Diff	72°	.3	.8	10	2.1	3.0	20	100	5	700
A	MT2123-G	GaP/GaP	Green Diff	72°	.8	2.0	10	2.1	3.0	20	100	5	567
A	MT3123-Y	GaAsP/GaP	Yellow Diff	72°	.6	1.6	10	2.1	3.0	20	100	5	585
A	MT4123-O	GaAsP/GaP	Orange Diff	72°	.9	2.3	10	2.1	3.0	20	100	5	635
A	MT4123-HR	GaAsP/GaP	Red Diff	72°	.9	2.3	10	2.1	3.0	20	100	5	635
B	MT1130-R	GaAsP/GaAs	Red Diff	120°	.2	.5	10	1.7	2.0	20	100	3	655
B	MT1130-RG	GaP/GaP	Red Diff	120°	.3	.8	10	2.1	3.0	20	100	5	700
B	MT2130-G	GaP/GaP	Green Diff	120°	.8	2.0	10	2.1	3.0	20	100	5	567
B	MT3130-Y	GaAsP/GaP	Yellow Diff	120°	.6	1.8	10	2.1	3.0	20	100	5	585
B	MT4130-O	GaAsP/GaP	Orange Diff	120°	.9	2.3	10	2.1	3.0	20	100	5	635
B	MT4130-HR	GaAsP/GaP	Red Diff	120°	.9	2.3	10	2.1	3.0	20	100	5	635



# 2x5mm Rectangular LED Lamp

## FEATURES

- Flangeless package
- All plastic mold type
- Low drive current
- High intensity light emission



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1152-R	30	3	100	-25~+85	-25~+100
MT1152-RG	30	5	85	-25~+85	-25~+100
MT2152-G	30	5	85	-25~+85	-25~+100
MT3152-Y	30	5	85	-25~+85	-25~+100
MT4152-O	30	5	85	-25~+85	-25~+100
MT4152-HR	30	5	85	-25~+85	-25~+100
MT1252-R	30	3	100	-25~+85	-25~+100
MT4252-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
MT1152-R	GaAsP	Red Diff	84°	0.2	0.6	10	1.7	2.0	20	100	3	655
MT1152-RG	GaP	Red Diff	84°	0.4	0.9	10	2.1	3.0	20	100	5	700
MT2152-G	GaP	Green Diff	84°	0.9	2.3	10	2.1	3.0	20	100	5	567
MT3152-Y	GaAsP/GaP	Yellow Diff	84°	0.8	1.9	10	2.1	3.0	20	100	5	585
MT4152-O	GaAsP/GaP	Orange Diff	84°	1.1	2.7	10	2.1	3.0	20	100	5	635
MT4152-HR	GaAsP/GaP	Red Diff	84°	1.1	2.7	10	2.1	3.0	20	100	5	635
MT1252-R	GaAsP	White Diff	84°	0.2	0.6	10	1.7	2.0	20	100	3	655
MT4252-HR	GaAsP/GaP	White Diff	84°	1.1	2.7	10	2.1	3.0	20	100	5	635



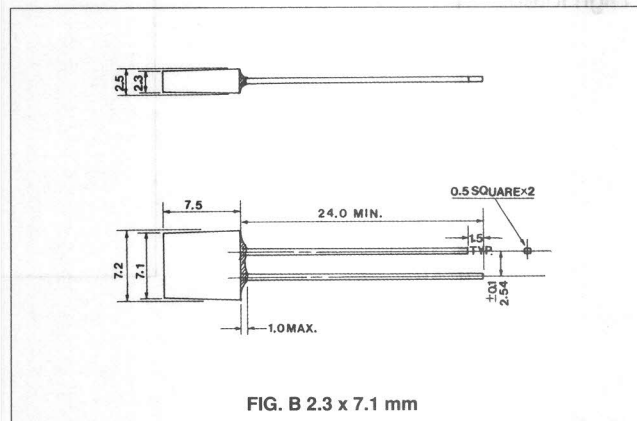
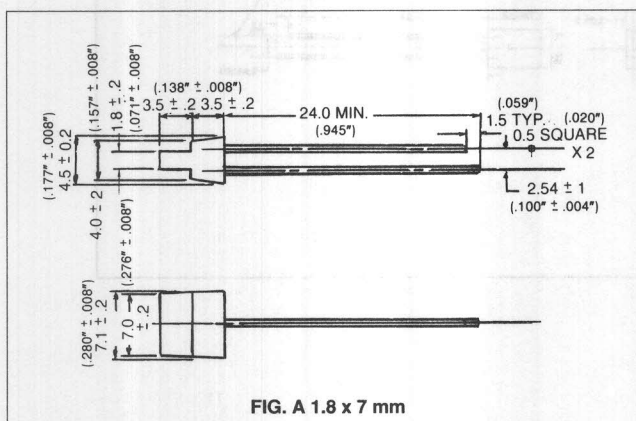
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# 1.8x7mm/2.3x7.1mm Rectangular LED Lamps

## FEATURES

- All plastic mold type
- Low drive current
- High intensity light emission



## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT1158-RG	30	5	85	-25~+85	-25~+100
A	MT2158-G	30	5	85	-25~+85	-25~+100
A	MT3158-Y	30	5	85	-25~+85	-25~+100
B	MT1172-R	30	3	100	-25~+85	-25~+100
B	MT1172-RG	30	5	85	-25~+85	-25~+100
B	MT2172-G	30	5	85	-25~+85	-25~+100
B	MT3172-Y	30	5	85	-25~+85	-25~+100
B	MT4172-O	30	5	85	-25~+85	-25~+100
B	MT4172-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	
A	MT1158-RG	GaP/GaP	Red Diff	75°	.3	.8	10	2.1	3.0	20	100	5	700
A	MT2158-G	GaP/GaP	Green Diff	75°	1.3	3.2	10	2.1	3.0	20	100	5	567
A	MT3158-Y	GaAsP/GaP	Yellow Diff	75°	1.1	2.6	10	2.1	3.0	20	100	5	585
B	MT1172-R	GaAsP/GaAs	Red Diff	70°	.3	.7	10	1.7	2.0	20	100	3	655
B	MT1172-RG	GaP/GaP	Red Diff	70°	.4	1.1	10	2.1	3.0	20	100	5	700
B	MT2172-G	GaP/GaP	Green Diff	70°	1.1	2.7	10	2.1	3.0	20	100	5	567
B	MT3172-Y	GaAsP/GaP	Yellow Diff	70°	.9	2.2	10	2.1	3.0	20	100	5	585
B	MT4172-O	GaAsP/GaP	Orange Diff	70°	1.3	3.2	10	2.1	3.0	20	100	5	635
B	MT4172-HR	GaAsP/GaP	Red Diff	70°	1.3	3.2	10	2.1	3.0	20	100	5	635



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# 3.2x5.6mm/5x5mm Rectangular LED Lamps

## FEATURES

- All plastic mold type
- Low drive current
- High intensity light emission
- Choice of six colors/materials

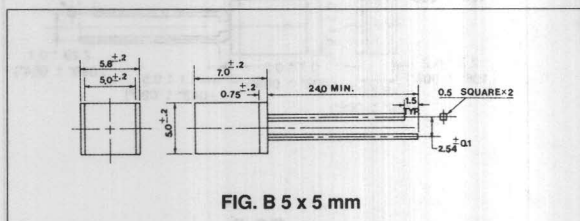


FIG. B 5 x 5 mm

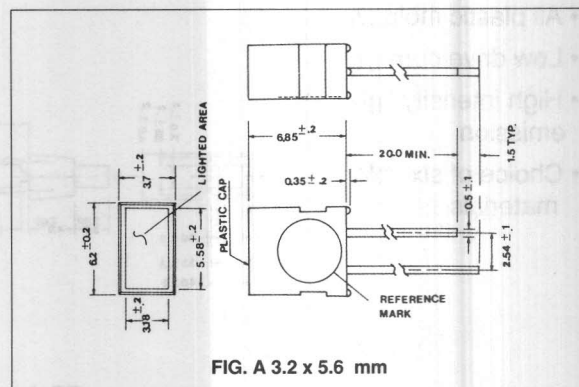


FIG. A 3.2 x 5.6 mm

## MAXIMUM RATINGS (Ta = 25°C)

F I G	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT1173-R	30	3.0	100	-25~+85	-25~+100
A	MT1173-RG	30	5.0	85	-25~+85	-25~+100
A	MT2173-G	30	5.0	85	-25~+85	-25~+100
A	MT3173-Y	30	5.0	85	-25~+85	-25~+100
A	MT4173-O	30	5.0	85	-25~+85	-25~+100
A	MT4173-HR	30	5.0	85	-25~+85	-25~+100
B	MT1119-R	30	3.0	100	-25~+85	-25~+100
B	MT1119-RG	30	5.0	85	-25~+85	-25~+100
B	MT2119-G	30	5.0	85	-25~+85	-25~+100
B	MT3119-Y	30	5.0	85	-25~+85	-25~+100
B	MT4119-O	30	5.0	85	-25~+85	-25~+100
B	MT4119-HR	30	5.0	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

F I G	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
A	MT1173-R	GaAsP/GaAs	Red Diff	60°	.4	1.0	10	1.7	2.0	20	100	3	655
A	MT1173-RG	GaP/GaP	Red Diff	60°	.6	1.5	10	2.1	3.0	20	100	5	700
A	MT2173-G	GaP/GaP	Green Diff	60°	1.6	3.9	10	2.1	3.0	20	100	5	567
A	MT3173-Y	GaAsP/GaP	Yellow Diff	60°	1.3	3.2	10	2.1	3.0	20	100	5	585
A	MT4173-O	GaAsP/GaP	Orange Diff	60°	1.8	4.5	10	2.1	3.0	20	100	5	635
A	MT4173-HR	GaAsP/GaP	Red Diff	60°	1.8	4.5	10	2.1	3.0	20	100	5	635
B	MT1119-R	GaAsP/GaAs	Red Diff	88°	.2	.6	10	1.7	2.0	20	100	3	655
B	MT1119-RG	GaP/GaP	Red Diff	88°	.5	.9	10	2.1	3.0	20	100	5	700
B	MT2119-G	GaP/GaP	Green Diff	88°	.9	2.3	10	2.1	3.0	20	100	5	567
B	MT3119-Y	GaAsP/GaP	Yellow Diff	88°	.8	1.9	10	2.1	3.0	20	100	5	585
B	MT4119-O	GaAsP/GaP	Orange Diff	88°	1.1	2.7	10	2.1	3.0	20	100	5	635
B	MT4119-HR	GaAsP/GaP	Red Diff	88°	1.1	2.7	10	2.1	3.0	20	100	5	635



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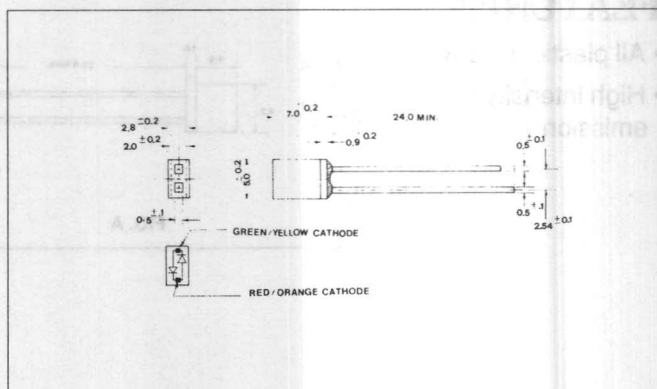




# Rectangular 2 Leaded Tristate

## FEATURES

- Uniform color brightness at same current levels
- 2x5mm Rectangular LED
- White diffused lens



STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	REVERSE CURRENT (I <sub>R</sub> ) (μA)	FORWARD CURRENT (I <sub>F</sub> ) (mA)	FORWARD VOLTAGE (V <sub>F</sub> ) (V)	WAVELENGTH (nm)	VIEWING ANGLE (°)	LENS COLOR	MATERIAL	PART NO.
-55~+100	-55~+85	85	5	100	30	2.1~3.0	700	84°	White Diff	GaP/GaP	MT2053-RG (R)
-55~+100	-55~+85	85	5	100	30	2.1~3.0	567	84°	White Diff	GaP/GaP	MT2053-RG (G)
-55~+100	-55~+85	85	5	100	30	2.1~3.0	635	84°	White Diff	GaAsP/GaP	MT2053-HRG (HR)
-55~+100	-55~+85	85	5	100	30	2.1~3.0	567	84°	White Diff	GaP/GaP	MT2053-HRG (G)
-55~+100	-55~+85	85	5	100	30	2.1~3.0	585	84°	White Diff	GaAsP/GaP	MT2053-YG (Y)
-55~+100	-55~+85	85	5	100	30	2.1~3.0	567	84°	White Diff	GaP/GaP	MT2053-YG (G)

## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT2053-RG (R)	30	5	85	-25~+85	-25~+100
(G)	30	5	85	-25~+85	-25~+100
MT2053-HRG (HR)	30	5	85	-25~+85	-25~+100
(G)	30	5	85	-25~+85	-25~+100
MT2053-YG (Y)	30	5	85	-25~+85	-25~+100
(G)	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max	@mA	μA	V <sub>r</sub>	nm
MT2053-RG (R)	GaP/GaP	White Diff	84°	-	1.2	10		2.1	3.0	20	100	5	700
(G)	GaP/GaP	White Diff	84°	-	3.1	10		2.1	3.0	20	100	5	567
MT2053-HRG (HR)	GaAsP/GaP	White Diff	84°	-	3.6	10		2.1	3.0	20	100	5	635
(G)	GaP/GaP	White Diff	84°	-	3.1	10		2.1	3.0	20	100	5	567
MT2053-YG (Y)	GaAsP/GaP	White Diff	84°	-	2.6	10		2.1	3.0	20	100	5	585
(G)	GaP/GaP	White Diff	84°	-	3.1	10		2.1	3.0	20	100	5	567



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# Cylindrical LED Lamps

## FEATURES

- All plastic mold type
- High intensity light emission

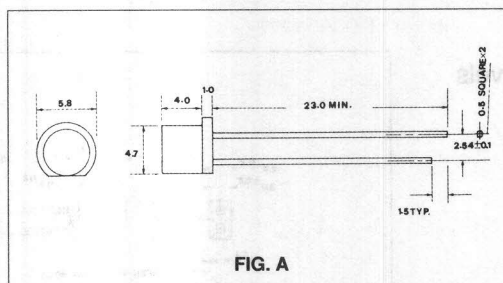


FIG. A

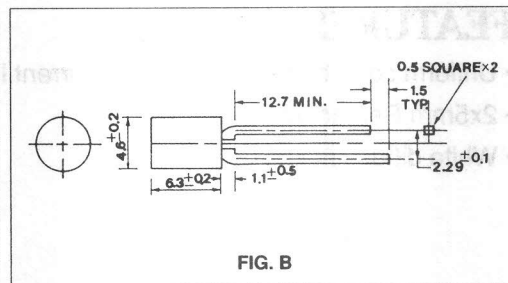


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT1195-R	30	3	100	-25~+85	-25~+100
A	MT1195-RG	30	5	85	-25~+85	-25~+100
A	MT2195-G	30	5	85	-25~+85	-25~+100
A	MT3195-Y	30	5	85	-25~+85	-25~+100
A	MT4195-O	30	5	85	-25~+85	-25~+100
A	MT4195-HR	30	5	85	-25~+85	-25~+100
B	MT1112-R	30	3	100	-25~+85	-25~+100
B	MT1112-RG	30	5	85	-25~+85	-25~+100
B	MT2112-G	30	5	85	-25~+85	-25~+100
B	MT3112-Y	30	5	85	-25~+85	-25~+100
B	MT4112-O	30	5	85	-25~+85	-25~+100
B	MT4112-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT1195-R	GaAsP/GaAs	Red Diff	98°	.2	.6	10	1.7	2.0	20	100	3	655
A	MT1195-RG	GaP/GaP	Red Diff	98°	.4	.9	10	2.1	3.0	20	100	5	700
A	MT2195-G	GaP/GaP	Green Diff	98°	.9	2.3	10	2.1	3.0	20	100	5	567
A	MT3195-Y	GaAsP/GaP	Yellow Diff	98°	.8	1.9	10	2.1	3.0	20	100	5	585
A	MT4195-O	GaAsP/GaP	Orange Diff	98°	1.1	2.7	10	2.1	3.0	20	100	5	635
A	MT4195-HR	GaAsP/GaP	Red Diff	98°	1.1	2.7	10	2.1	3.0	20	100	5	635
B	MT1112-R	GaAsP/GaAs	Red Diff	100°	.2	.4	10	1.7	2.0	20	100	3	655
B	MT1112-RG	GaP/GaP	Red Diff	100°	.2	.6	10	2.1	3.0	20	100	5	700
B	MT2112-G	GaP/GaP	Green Diff	100°	.6	1.6	10	2.1	3.0	20	100	5	567
B	MT3112-Y	GaAsP/GaP	Yellow Diff	100°	.5	1.3	10	2.1	3.0	20	100	5	585
B	MT4112-O	GaAsP/GaP	Orange Diff	100°	.7	1.8	10	2.1	3.0	20	100	5	635
B	MT4112-HR	GaAsP/GaP	Red Diff	100°	.7	1.8	10	2.1	3.0	20	100	5	635



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# Cylindrical LED Lamps

## FEATURES

- Low drive current
- All plastic mold type
- High intensity light emission

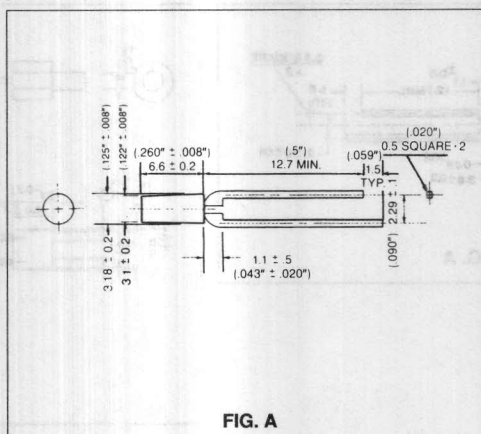


FIG. A

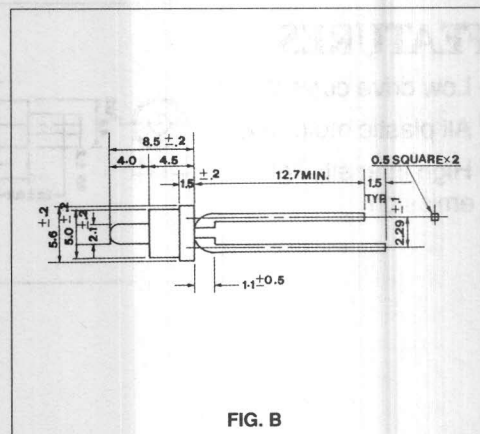


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT1137-R	30	3	100	-25~+85	-25~+100
A	MT1137-RG	30	5	85	-25~+85	-25~+100
A	MT2137-G	30	5	85	-25~+85	-25~+100
A	MT3137-Y	30	5	85	-25~+85	-25~+100
A	MT4137-O	30	5	85	-25~+85	-25~+100
A	MT4137-HR	30	5	85	-25~+85	-25~+100
B	MT1132-R	30	3	100	-25~+85	-25~+100
B	MT1132-RG	30	5	85	-25~+85	-25~+100
B	MT2132-G	30	5	85	-25~+85	-25~+100
B	MT3132-Y	30	5	85	-25~+85	-25~+100
B	MT4132-O	30	5	85	-25~+85	-25~+100
B	MT4132-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT1137-R	GaAsP/GaAs	Red Diff	180°	.2	.4	10	1.7	2.0	20	100	3	655
A	MT1137-RG	GaP/GaP	Red Diff	180°	.2	.6	10	2.1	3.0	20	100	5	700
A	MT2137-G	GaP/GaP	Green Diff	180°	.6	1.6	10	2.1	3.0	20	100	5	567
A	MT3137-Y	GaAsP/GaP	Yellow Diff	180°	.5	1.3	10	2.1	3.0	20	100	5	585
A	MT4137-O	GaAsP/GaP	Orange Diff	180°	.7	1.8	10	2.1	3.0	20	100	5	635
A	MT4137-HR	GaAsP/GaP	Red Diff	180°	.7	1.8	10	2.1	3.0	20	100	5	635
B	MT1132-R	GaAsP/GaAs	Red Diff	114°	.3	.7	10	1.7	2.0	20	100	3	655
B	MT1132-RG	GaP/GaP	Red Diff	114°	.4	1.1	10	2.1	3.0	20	100	5	700
B	MT2132-G	GaP/GaP	Green Diff	114°	1.1	2.8	10	2.1	3.0	20	100	5	567
B	MT3132-Y	GaAsP/GaP	Yellow Diff	114°	.9	2.2	10	2.1	3.0	20	100	5	585
B	MT4132-O	GaAsP/GaP	Orange Diff	114°	1.3	3.2	10	2.1	3.0	20	100	5	635
B	MT4132-HR	GaAsP/GaP	Red Diff	114°	1.3	3.2	10	2.1	3.0	20	100	5	635



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# Cylindrical LED Lamps

## FEATURES

- Low drive current
- All plastic mold type
- High intensity light emission

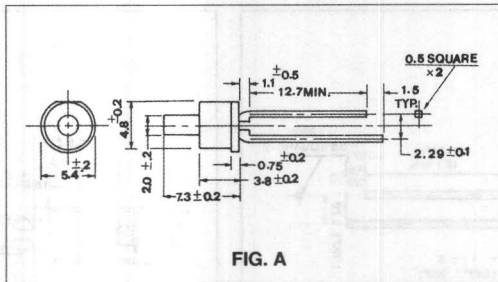


FIG. A

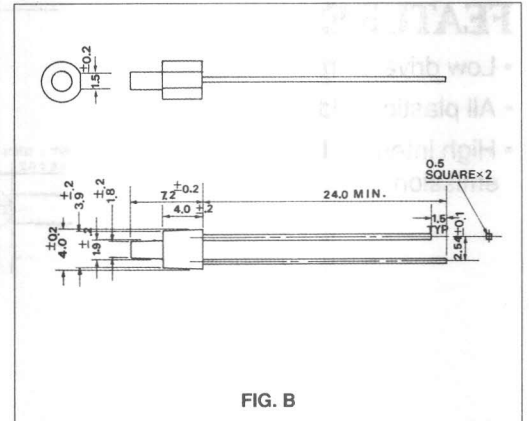


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT1113-R	30	3	85	-25~+85	-25~+100
A	MT1113-RG	30	5	100	-25~+85	-25~+100
A	MT2113-G	30	5	100	-25~+85	-25~+100
A	MT3113-Y	30	5	100	-25~+85	-25~+100
A	MT4113-O	30	5	100	-25~+85	-25~+100
A	MT4113-HR	30	5	100	-25~+85	-25~+100
B	MT1141-R	30	3	85	-25~+85	-25~+100
B	MT1141-RG	30	5	100	-25~+85	-25~+100
B	MT2141-G	30	5	100	-25~+85	-25~+100
B	MT3141-Y	30	5	100	-25~+85	-25~+100
B	MT4141-O	30	5	100	-25~+85	-25~+100
B	MT4141-HR	30	5	100	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT1113-R	GaAsP/GaAs	Red Diff	106°	.3	.7	10	1.7	2.0	20	100	3	655
A	MT1113-RG	GaP/GaP	Red Diff	106°	.4	1.1	10	2.1	3.0	20	100	5	700
A	MT2113-G	GaP/GaP	Green Diff	106°	1.1	2.7	10	2.1	3.0	20	100	5	567
A	MT3113-Y	GaAsP/GaP	Yellow Diff	106°	.9	2.2	10	2.1	3.0	20	100	5	585
A	MT4113-O	GaAsP/GaP	Orange Diff	106°	1.3	3.2	10	2.1	3.0	20	100	5	635
A	MT4113-HR	GaAsP/GaP	Red Diff	106°	1.3	3.2	10	2.1	3.0	20	100	5	635
B	MT1141-R	GaAsP/GaAs	Red Diff	106°	-	.7	10	1.7	2.0	20	100	3	655
B	MT1141-RG	GaP/GaP	Red Diff	106°	-	1.1	10	2.1	3.0	20	100	5	700
B	MT2141-G	GaP/GaP	Green Diff	106°	-	2.7	10	2.1	3.0	20	100	5	567
B	MT3141-Y	GaAsP/GaP	Yellow Diff	106°	-	2.2	10	2.1	3.0	20	100	5	585
B	MT4141-O	GaAsP/GaP	Orange Diff	106°	-	3.2	10	2.1	3.0	20	100	5	635
B	MT4141-HR	GaAsP/GaP	Red Diff	106°	-	3.2	10	2.1	3.0	20	100	5	635



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## 35





# Low Current LED Lamps

## FEATURES

- Optimized for low D.C. current operation
- CMOS and TTL compatible
- Excellent brightness at 2mA
- Color diffused package

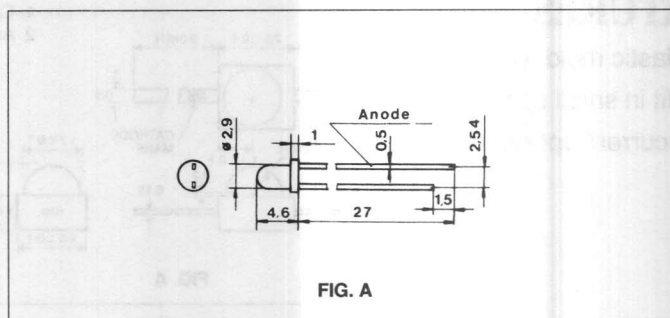


FIG. A

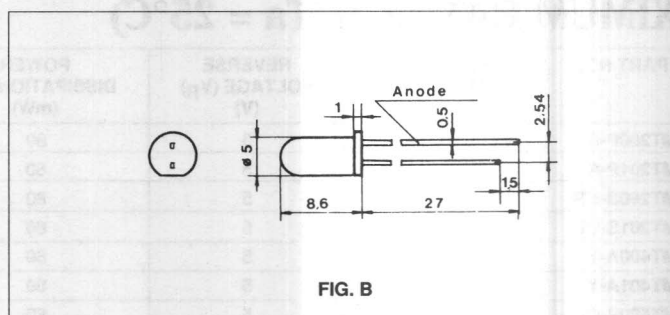


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT4093-HR(2mA)	30	5.0	105	-50~+100	-50~+100
A	MT4093-G(2mA)	25	5.0	105	-50~+100	-50~+100
A	MT4093-Y(2mA)	30	5.0	105	-50~+100	-50~+100
A	MT4093-UR(2mA)	30	5.0	100	-50~+100	-50~+100
B	MT305-SLHR(2mA)	30	5.0	105	-50~+100	-50~+100
B	MT305-SLG(2mA)	25	5.0	105	-50~+100	-50~+100
B	MT305-SLY(2mA)	30	5.0	105	-50~+100	-50~+100
B	MT305-SLUR(2mA)	30	5.0	100	-50~+100	-50~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>		
A	MT4093-HR(2mA)	GaAsP/GaP	Red Diff	120°	.8	2.0	2	2.0	2.5	20	10	5	625	45
A	MT4093-G(2mA)	GaP/GaP	Green Diff	120°	.8	2.0	2	2.2	2.5	20	10	5	565	30
A	MT4093-Y(2mA)	GaAsP/GaP	Yellow Diff	120°	.8	2.0	2	2.1	2.5	20	10	5	590	35
A	MT4093-UR(2mA)	GaAlAs	Red Diff	120°	8	20	2	1.85	2.5	20	10	5	660	20
B	MT305-SLHR(2mA)	GaAsP/GaP	Red Diff	120°	.8	2.0	2	2.0	2.5	20	10	5	625	45
B	MT305-SLG(2mA)	GaP/GaP	Green Diff	120°	.8	2.0	2	2.2	2.5	20	10	5	565	30
B	MT305-SLY(2mA)	GaAsP/GaP	Yellow Diff	120°	.8	2.0	2	2.1	2.5	20	10	5	590	35
B	MT305-SLUR(2mA)	GaAlAs	Red Diff	120°	8.0	12.5	2	1.85	2.5	20	10	5	660	20



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# Axial Leaded LED Lamps

## FEATURES

- All plastic mold type
- Will fit in small space
- Low current operations

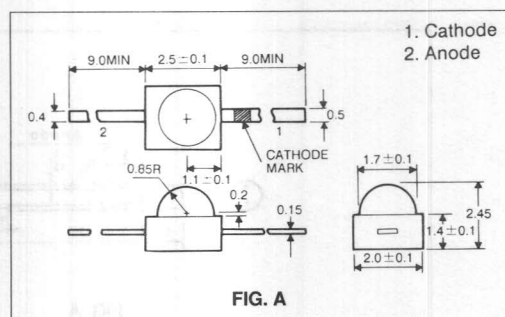


FIG. A

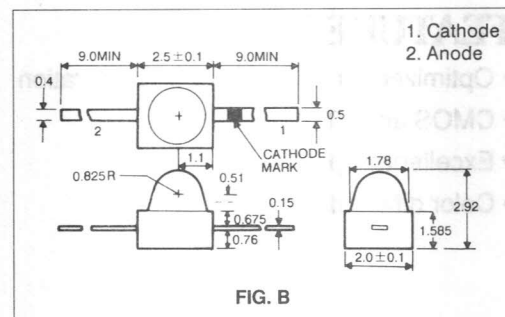


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT200P-R	30	5	80	-25~+70	-25~+80
A	MT201P-R	30	5	80	-25~+70	-25~+80
A	MT200S-UR	30	5	80	-25~+70	-25~+80
A	MT201S-UR	30	5	80	-25~+70	-25~+80
A	MT400A-Y	30	5	80	-25~+70	-25~+80
A	MT401A-Y	30	5	80	-25~+70	-25~+80
A	MT500P-G	30	5	80	-25~+70	-25~+80
A	MT501P-G	30	5	80	-25~+70	-25~+80
B	MT220P-R	30	5	80	-25~+70	-25~+80
B	MT221P-R	30	5	80	-25~+70	-25~+80
B	MT220S-UR	30	5	80	-25~+70	-25~+80
B	MT221S-UR	30	5	80	-25~+70	-25~+80
B	MT420A-Y	30	5	80	-25~+70	-25~+80
B	MT421A-Y	30	5	80	-25~+70	-25~+80
B	MT520P-G	30	5	80	-25~+70	-25~+80
B	MT521P-G	30	5	80	-25~+70	-25~+80

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				min.	typ.	@mA	typ.	max.	@mA	μA	Vr	
A	MT200P-R	GaP/GaP	Water Clear	.8	1.6	20	2.1	2.8	20	10	5	700
A	MT201P-R	GaP/GaP	Red Diff	.5	1.0	20	2.1	2.8	20	10	5	700
A	MT200S-UR	GaAlAs	Water Clear	4.0	8.0	20	1.8	2.4	20	10	5	660
A	MT201S-UR	GaAlAs	Red Diff	3.0	5.0	20	1.8	2.4	20	10	5	660
A	MT400A-Y	GaAsP/GaP	Water Clear	1.0	2.0	20	2.1	2.8	20	10	5	585
A	MT401A-Y	GaAsP/GaP	Yellow Diff	.6	1.2	20	2.1	2.8	20	10	5	585
A	MT500P-G	GaP/GaP	Water Clear	2.0	4.0	20	2.1	2.8	20	10	5	565
A	MT501P-G	GaP/GaP	Green Diff	1.5	3.0	20	2.1	2.8	20	10	5	565
B	MT220P-R	GaP/GaP	Water Clear	.8	1.6	20	2.1	2.8	20	10	5	700
B	MT221P-R	GaP/GaP	Red Diff	.5	1.0	20	2.1	2.8	20	10	5	700
B	MT220S-UR	GaAlAs	Water Clear	4.0	8.0	20	1.8	2.4	20	10	5	660
B	MT221S-UR	GaAlAs	Red Diff	3.0	5.0	20	1.8	2.4	20	10	5	660
B	MT420A-Y	GaAsP/GaP	Water Clear	1.0	2.0	20	2.1	2.8	20	10	5	585
B	MT421A-Y	GaAsP/GaP	Yellow Diff	.6	1.2	20	2.1	2.8	20	10	5	585
B	MT520P-G	GaP/GaP	Water Clear	2.0	4.0	20	2.1	2.8	20	10	5	565
B	MT521P-G	GaP/GaP	Green Diff	1.5	3.0	20	2.1	2.8	20	10	5	565



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# Axial Leaded LED Lamps

## FEATURES

- Non lensed surface
- All plastic mold type
- Will fit in small space
- Low current operations

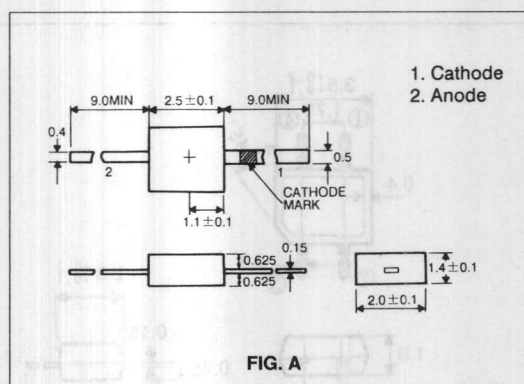


FIG. A

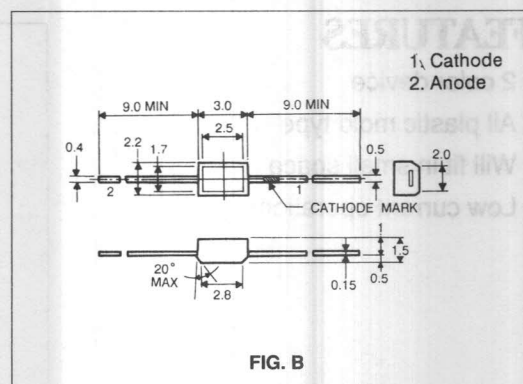


FIG. B

## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

FIG	PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
A	MT210P-R	30	5	80	-25~+70	-25~+80
A	MT211P-R	30	5	80	-25~+70	-25~+80
A	MT210S-UR	30	5	80	-25~+70	-25~+80
A	MT211S-UR	30	5	80	-25~+70	-25~+80
A	MT410A-Y	30	5	80	-25~+70	-25~+80
A	MT411A-Y	30	5	80	-25~+70	-25~+80
A	MT510P-G	30	5	80	-25~+70	-25~+80
A	MT511P-G	30	5	80	-25~+70	-25~+80
B	MT202-UR	30	5	80	-25~+70	-25~+80
B	MT303-HR	30	5	80	-25~+70	-25~+80
B	MT404-Y	30	5	80	-25~+70	-25~+80
B	MT505-G	30	5	80	-25~+70	-25~+80

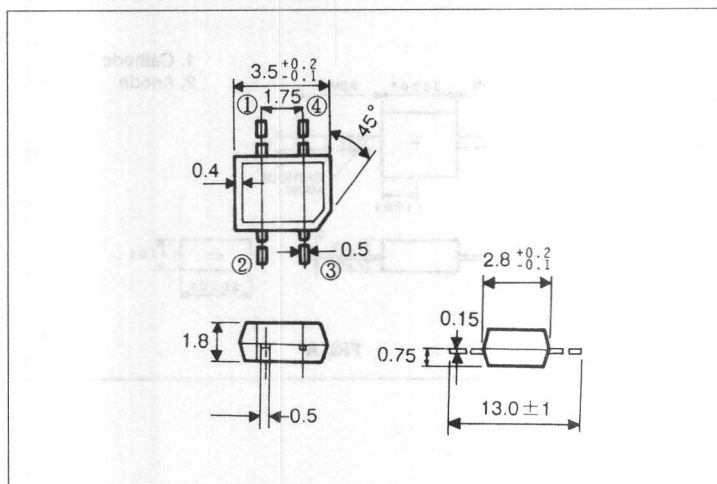
## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

FIG	PART NO.	MATERIAL	LENS COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				min.	typ.	@mA	typ.	max.	@mA	$\mu\text{A}$	$V_r$	
A	MT210P-R	GaP/GaP	Water Clear	.2	.4	20	2.1	2.8	20	10	5	700
A	MT211P-R	GaP/GaP	Red Diff	.15	.3	20	2.1	2.8	20	10	5	700
A	MT210S-UR	GaAlAs	Water Clear	1.5	3.0	20	1.8	2.4	20	10	5	660
A	MT211S-UR	GaAlAs	Red Diff	.8	1.5	20	1.8	2.4	20	10	5	660
A	MT410A-Y	GaAsP/GaP	Water Clear	.3	.5	20	2.1	2.8	20	10	5	585
A	MT411A-Y	GaAsP/GaP	Yellow Diff	.15	.3	20	2.1	2.8	20	10	5	585
A	MT510P-G	GaP/GaP	Water Clear	.8	1.5	20	2.1	2.8	20	10	5	565
A	MT511P-G	GaP/GaP	Green Diff	.2	.5	20	2.1	2.8	20	10	5	565
B	MT202-UR	GaAlAs	Water Clear	3.0	6.0	20	1.8	2.4	20	10	5	660
B	MT303-HR	GaAsP/GaP	Water Clear	1.8	2.5	20	2.1	2.8	20	10	5	635
B	MT404-Y	GaAsP/GaP	Water Clear	.5	1.0	20	2.1	2.8	20	10	5	585
B	MT505-G	GaP/GaP	Water Clear	1.0	2.0	20	2.1	2.8	20	10	5	565

# Bi-Color Axial Leaded LED Lamps

## FEATURES

- 2 color device
- All plastic mold type
- Will fit in small space
- Low current operations



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT255-URG (UR)	30	5	80	-25~+70	-25~+80
(G)	30	5	80	-25~+70	-25~+80
MT355-HRG (HR)	30	5	80	-25~+70	-25~+80
(G)	30	5	80	-25~+70	-25~+80

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
			min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	
MT255-URG (UR)	GaAlAs	Water Clear	3.0	6.0	20	1.8	2.4	20	10	5	660
(G)	GaP/GaP	Water Clear	1.0	2.0	20	2.1	2.8	20	10	5	565
MT355-HRG (HR)	GaAsP/GaP	Water Clear	1.8	2.5	20	2.1	2.8	20	10	5	635
(G)	GaP/GaP	Water Clear	1.0	2.0	20	2.1	2.8	20	10	5	565



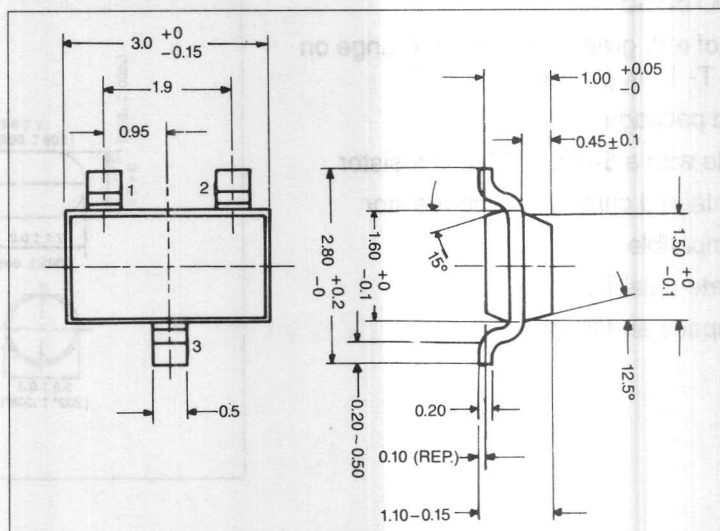
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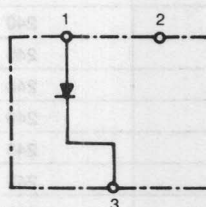
# Surface Mount LED Lamps

## FEATURES

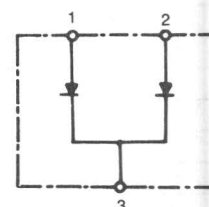
- SOT-23 package
- Water clear
- Capable of pulse operation



## CIRCUITRY



SINGLE COLOR



BI-COLOR

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	EMITTING COLOR	RESIN COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
			min.	typ.	@mA	typ.	max.	@mA	μA	Vr	
MTSM2015-R	Red	Water Clear	-	2.0	20	2.1	2.8	20	100	5	700
MTSM3015-HR	Hi-Eff Red	Water Clear	-	3.5	20	2.1	2.8	20	100	5	635
MTSM4015-Y	Yellow	Water Clear	-	3.0	20	2.1	2.8	20	100	5	585
MTSM5015-G	Green	Water Clear	-	3.0	20	2.1	2.8	20	100	5	565
MTSM3415-HRY	Hi-Eff Red/Yellow	Water Clear	-	3.0	20	2.1	2.8	20	100	5	635/585
MTSM3515-HRG	Hi-Eff Red/Green	Water Clear	-	3.0	20	2.1	2.8	20	100	5	635/565
MTSM4515-YG	Yellow/Green	Water Clear	-	3.0	20	2.1	2.8	20	100	5	585/565



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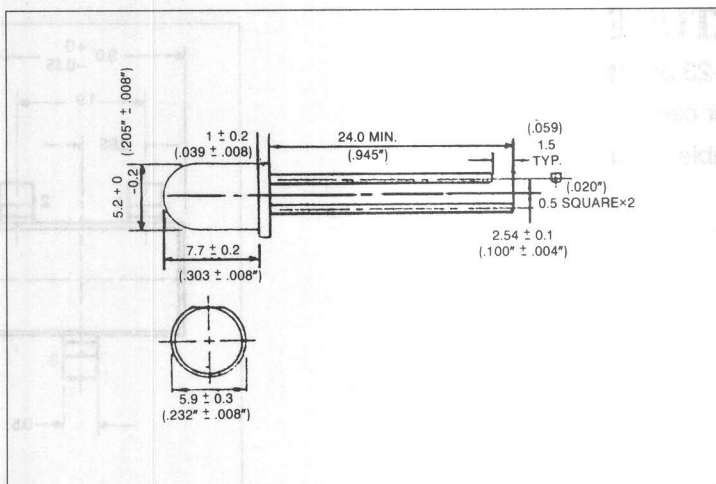
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# Specialty LEDS/Integrated Resistor LED Lamps

## FEATURES

- Choice of red, green, yellow and orange on popular T- 1 3/4 package
- Diffused package
- Available with a 5-volt or 12-volt resistor
- Self-contained current limiting resistor
- TTL compatible
- Solid state reliability
- Saves space and labor



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT1118G-5VR	7	8	240	-25~+85	-25~+100
MT1118-5VR	6.7	7	240	-25~+85	-25~+100
MT2118-5VG	7	8	240	-25~+85	-25~+100
MT3118-5VY	7	8	240	-25~+85	-25~+100
MT4118-5VO	7	8	240	-25~+85	-25~+100
MT4118-5VHR	7	8	240	-25~+85	-25~+100
MT1118G-12VR	15	17	240	-25~+85	-25~+100
MT1118-12VR	14.7	15	240	-25~+85	-25~+100
MT2118-12VG	15	17	240	-25~+85	-25~+100
MT3118-12VY	15	17	240	-25~+85	-25~+100
MT4118-12VO	15	17	240	-25~+85	-25~+100
MT4118-12VHR	15	17	240	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD CURRENT (mA)		REVERSE CURRENT		PEAK WAVELENGTH	SPEC. LINE HALF WIDTH
			typ.	min.	typ.	@V		typ.	@V	μA	Vr	nm	nm
MT1118G-5VR	GaP/GaP	Red Diff	40°	1.3	2.2	5		10	5	100	8	700	100
MT1118-5VR	GaAsP/GaAs	Red Diff	40°	1.02	1.7	5		10	5	100	7	655	40
MT2118-5VG	GaP/GaP	Green Diff	40°	2.3	3.9	5		10	5	100	8	567	25
MT3118-5VY	GaAsP/GaP	Yellow Diff	40°	2.0	3.4	5		10	5	100	8	585	32
MT4118-5VO	GaAsP/GaP	Orange Diff	40°	2.7	4.5	5		10	5	100	8	635	40
MT4118-5VHR	GaAsP/GaP	Red Diff	40°	2.7	4.5	5		10	5	100	8	635	40
MT1118G-12VR	GaP/GaP	Red Diff	40°	1.3	2.2	12		10	12	100	17	700	100
MT1118-12VR	GaAsP/GaAs	Red Diff	40°	1.02	1.7	12		10	12	100	15	655	40
MT2118-12VG	GaP/GaP	Green Diff	40°	2.3	3.9	12		10	12	100	17	567	25
MT3118-12VY	GaAsP/GaP	Yellow Diff	40°	2.0	3.4	12		10	12	100	17	585	32
MT4118-12VO	GaAsP/GaP	Orange Diff	40°	2.7	4.5	12		10	12	100	17	635	40
MT4118-12VHR	GaAsP/GaP	Red Diff	40°	2.7	4.5	12		10	12	100	17	635	40

# Specialty LEDs/Special Shaped Lamps

## FEATURES

- Low drive current
- High intensity light emission

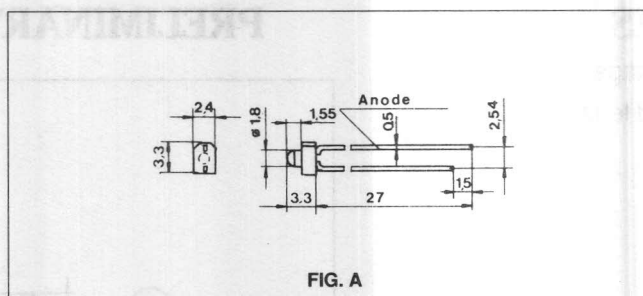


FIG. A

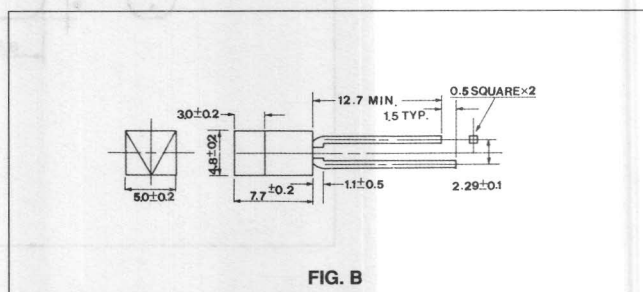


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT6010B-G	25	5	105	-50~+100	-50~+100
A	MT6010B-Y	30	5	105	-50~+100	-50~+100
A	MT6010B-HR	30	5	105	-50~+100	-50~+100
A	MT6010D-UR	30	5	100	-50~+100	-50~+100
B	MT1111-R	30	3	100	-25~+85	-25~+100
B	MT1111-RG	30	5	85	-25~+85	-25~+100
B	MT2111-G	30	5	85	-25~+85	-25~+100
B	MT3111-Y	30	5	85	-25~+85	-25~+100
B	MT4111-O	30	5	85	-25~+85	-25~+100
B	MT4111-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MT6010B-G	GaP/GaP	Green Diff	40°	1.25	5.0	10	2.2	2.5	20	10	5	565
A	MT6010B-Y	GaAsP/GaP	Yellow Diff	40°	2.0	5.0	10	2.1	2.5	20	10	5	590
A	MT6010B-HR	GaAsP/GaP	Red Diff	40°	5.0	12.5	10	2.0	2.5	20	10	5	625
A	MT6010D-UR	GaAlAs	Red Diff	40°	32.0	50.0	10	1.85	2.5	20	10	5	660
B	MT1111-R	GaAsP/GaAs	Red Diff	92°	.2	.5	10	1.7	2.0	20	100	3	655
B	MT1111-RG	GaP/GaP	Red Diff	92°	.3	.7	10	2.1	3.0	20	100	5	700
B	MT2111-G	GaP/GaP	Green Diff	92°	.8	1.9	10	2.1	3.0	20	100	5	567
B	MT3111-Y	GaAsP/GaP	Yellow Diff	92°	.6	1.6	10	2.1	3.0	20	100	5	585
B	MT4111-O	GaAsP/GaP	Orange Diff	92°	.9	2.3	10	2.1	3.0	20	100	5	635
B	MT4111-HR	GaAsP/GaP	Red Diff	92°	.9	2.3	10	2.1	3.0	20	100	5	635



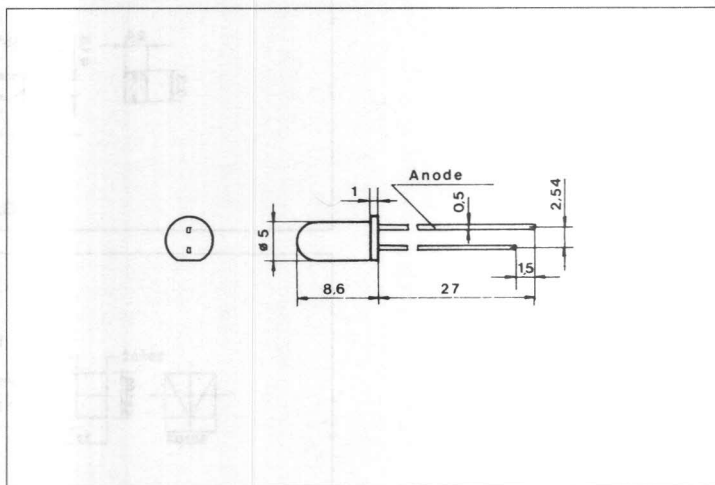
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# Specialty LEDS/Blinking LED Lamps

## FEATURES

- T - 1 3/4 package
- Color diffused lens

## PRELIMINARY



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT605F-G	38-56	.5	200	-40~+70	-50~+100
MT605F-Y	38-56	.5	200	-40~+70	-50~+100
MT605F-HR	38-56	.5	200	-40~+70	-50~+100
MT605F-UR	38-56	.5	200	-40~+70	-50~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)		FREQUENCY (Hz)	PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)
			typ.	min.	typ.	V <sub>F</sub>	typ.	@mA			
MT605F-G	GaP/GaP	Green Diff	120°	3.2	8.0	9	9-12	38-56	1.5-2.5	565	30
MT605F-Y	GaAsP/GaP	Yellow Diff	120°	5.0	12.5	9	9-12	38-56	1.5-2.5	590	35
MT605F-HR	GaAsP/GaP	Red Diff	120°	5.0	12.5	9	9-12	38-56	1.5-2.5	625	45
MT605F-UR	GaAlAs	Red Diff	120°	50	70	9	9-12	38-56	1.5-2.5	660	20



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# Blue LED Lamps

## FEATURES

- Silicon Carbide technology
- 470nm peak wavelength
- Low power consumption

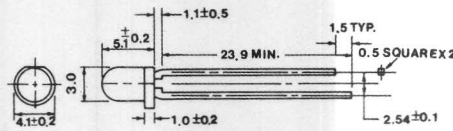


FIG. A - T-1

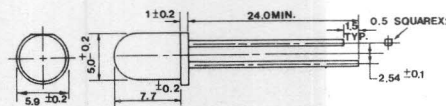


FIG. B - T-1 3/4

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT8163-BL	35	5.0	140	-20~+80	-25~+100
A	MT8263-BL	35	5.0	140	-20~+80	-25~+100
A	MT8363-BL	35	5.0	140	-20~+80	-25~+100
A	MT8463-BL	35	5.0	140	-20~+80	-25~+100
B	MT1118-BL	35	5.0	140	-20~+80	-25~+100
B	MT1218-BL	35	5.0	140	-20~+80	-25~+100
B	MT1318-BL	35	5.0	140	-20~+80	-25~+100
B	MT1418-BL	35	5.0	140	-20~+80	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

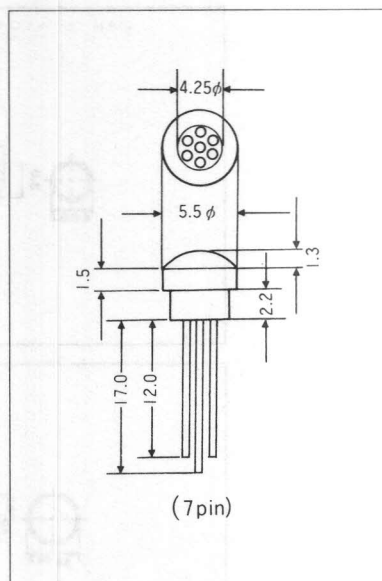
FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
A	MT8163-BL	SiC	Blue Diff	56°	0.4	0.9	20	3.1	4.0	20	30	5.0	470
A	MT8263-BL	SiC	White Diff	56°	0.4	0.9	20	3.1	4.0	20	30	5.0	470
A	MT8363-BL	SiC	Water Clear	36°	1.2	3.0	20	3.1	4.0	20	30	5.0	470
A	MT8463-BL	SiC	Blue Clear	36°	1.2	3.0	20	3.1	4.0	20	30	5.0	470
B	MT1118-BL	SiC	Blue Diff	44°	1.0	2.6	20	3.1	4.0	20	30	5.0	470
B	MT1218-BL	SiC	White Diff	44°	1.0	2.6	20	3.1	4.0	20	30	5.0	470
B	MT1318-BL	SiC	Water Clear	22°	3.5	8.8	20	3.1	4.0	20	30	5.0	470
B	MT1418-BL	SiC	Blue Clear	22°	3.5	8.8	20	3.1	4.0	20	30	5.0	470

# Multi-Chip LED Lamps

## MT106F-XX

### FEATURES

- 6 chip LED lamp
- Ceramic stem package
- Wide viewing angle
- Series connection



### MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT106F-HR	17	24	180	-20~+60	-30~+100
MT106F-PG	15	24	170	-20~+60	-30~+100
MT106F-YL	17	24	180	-20~+60	-30~+100
MT106F-SO	17	24	180	-20~+60	-30~+100
MT106F-UR	18	24	175	-20~+60	-30~+100
MT106F-UG	16	24	180	-20~+60	-30~+100
MT106F-ER	18	24	175	-20~+60	-30~+100
MT 106F-BL	15	30	280	-20~+60	-30~+100

### OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)		REVERSE CURRENT		PEAK WAVELENGTH	SPEC. LINE HALF WIDTH
		typ.	min.	typ.	@mA		typ.	@mA	μA	V <sub>r</sub>	nm	nm
MT106F-HR	GaAsP/GaP	160	12	25	10		10.6	10	100	24	630	30
MT106F-PG	GaP	160	5	10	10		11.4	10	100	24	557	30
MT106F-YL	GaAsP/GaP	160	7	15	10		10.6	10	100	24	585	30
MT106F-SO	GaAsP/GaP	160	10	20	10		10.6	10	100	24	615	30
MT106F-UR	GaAlAs/GaAs	160	20	40	10		9.8	10	100	24	660	30
MT106F-UG	GaP	160	25	50	10		11.3	10	100	24	565	30
MT106F-ER	GaAlAs/GaAlAs	160	70	140	10		9.8	10	100	24	660	25
MT106F-BL	SiC	160	-	630	10		18.0	10	30	30	470	70

\* (μcd)



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# Multi-Chip LED Lamps

## MT104F-XX MT104M-XX

### Features

- 4 chip LED lamp
- Ceramic stem package
- Wide viewing angle
- Series connection

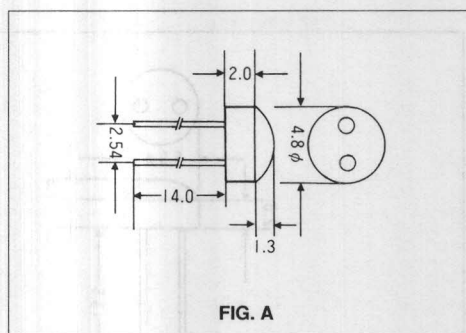


FIG. A

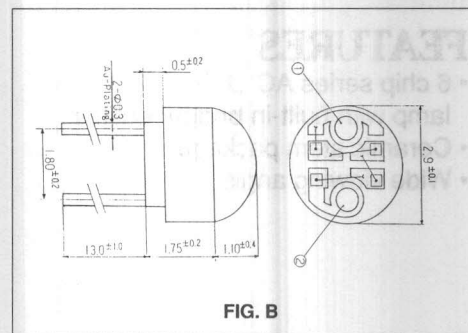


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MT104F-HR	14	16	107	-20~+60	-30~+100
A	MT104F-PG	12	16	100	-20~+60	-30~+100
A	MT104F-YL	14	16	107	-20~+60	-30~+100
A	MT104F-SO	14	16	107	-20~+60	-30~+100
A	MT104F-UR	15	16	104	-20~+60	-30~+100
A	MT104F-UG	13	16	107	-20~+60	-30~+100
A	MT104F-ER	15	16	104	-20~+60	-30~+100
B	MT104M-HR	6	8	50	-20~+60	-30~+100
B	MT104M-PG	6	8	50	-20~+60	-30~+100
B	MT104M-YL	6	8	50	-20~+60	-30~+100
B	MT104M-SO	6	8	50	-20~+60	-30~+100
B	MT104M-UR	6	8	50	-20~+60	-30~+100
B	MT104M-UG	6	8	50	-20~+60	-30~+100
B	MT104M-ER	6	8	50	-20~+60	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

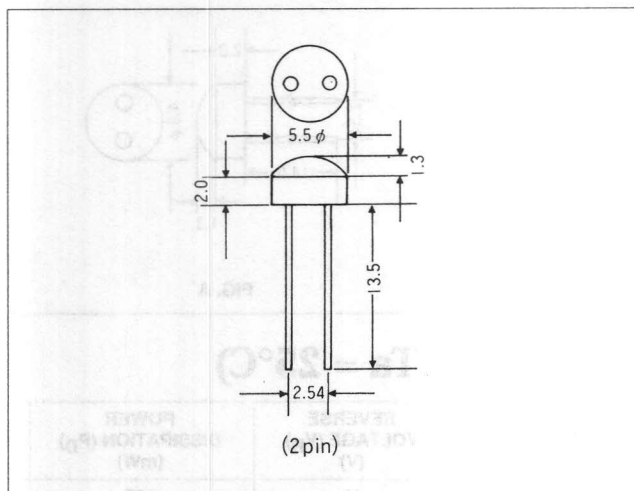
FIG	PART NO.	MATERIAL	VIEWING ANGLE typ.	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)		REVERSE CURRENT		PEAK WAVELENGTH nm	SPEC. LINE HALF WIDTH nm
				min.	typ.	@mA	typ.	@mA	μA	V <sub>r</sub>		
A	MT104F-HR	GaAsP/GaP	150	8.5	17	10	7.7	10	100	16	630	30
A	MT104F-PG	GaP	150	3.5	7	10	8.4	10	100	16	557	30
A	MT104F-YL	GaAsP/GaP	150	5	10	10	7.7	10	100	16	585	30
A	MT104F-SO	GaAsP/GaP	150	7	14	10	7.7	10	100	16	615	30
A	MT104F-UR	GaAlAs/GaAs	150	13.5	27	10	7.0	10	100	16	660	30
A	MT104F-UG	GaP	150	17	34	10	8.3	10	100	16	565	30
A	MT104F-ER	GaAlAs/GaAlAs	150	47	94	10	7.0	10	100	16	660	25
B	MT104M-HR	GaAsP/GaP	-	3	6	6	8	6	100	8	630	30
B	MT104M-PG	GaP	-	2	3	6	8	6	100	8	557	30
B	MT104M-YL	GaAsP/GaP	-	2	3	6	8	6	100	8	585	30
B	MT104M-SO	GaAsP/GaP	-	3	5	6	8	6	100	8	615	30
B	MT104M-UR	GaAlAs/GaAs	-	5	9	6	8	6	100	8	660	30
B	MT104M-UG	GaP	-	6	11	6	8	6	100	8	565	30
B	MT104M-ER	GaAlAs/GaAlAs	-	15	29	6	8	6	100	8	660	25



# Multi-Chip LED Lamps

## FEATURES

- 6 chip series AC LED lamp with built-in bridge rectifier
- Ceramic stem package
- Wide viewing angle



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MT101NP-HR	14	100	160	-20~+60	-30~+100
MT101NP-PG	12	100	150	-20~+60	-30~+100
MT101NP-YL	14	100	160	-20~+60	-30~+100
MT101NP-SO	14	100	160	-20~+60	-30~+100
MT101NP-UR	15	100	155	-20~+60	-30~+100
MT101NP-UG	13	100	160	-20~+60	-30~+100
MT101NP-ER	15	100	155	-20~+60	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)		REVERSE CURRENT		PEAK WAVELENGTH	SPEC. LINE HALF WIDTH
		min.	typ.	@mA	typ.	@mA	μA	V <sub>r</sub>	nm	nm
MT101NP-HR	GaAsP/GaP	12	25	10	11.5	10	100	100	630	30
MT101NP-PG	GaP	5	10	10	12.5	10	100	100	557	30
MT101NP-YL	GaAsP/GaP	7	15	10	11.5	10	100	100	585	30
MT101NP-SO	GaAsP/GaP	10	20	10	11.5	10	100	100	615	30
MT101NP-UR	GaAlAs/GaAs	20	40	10	10.5	10	100	100	660	30
MT101NP-UG	GaP	25	50	10	12.3	10	100	100	565	30
MT101NP-ER	GaAlAs/GaAlAs	70	140	10	10.5	10	100	100	660	25



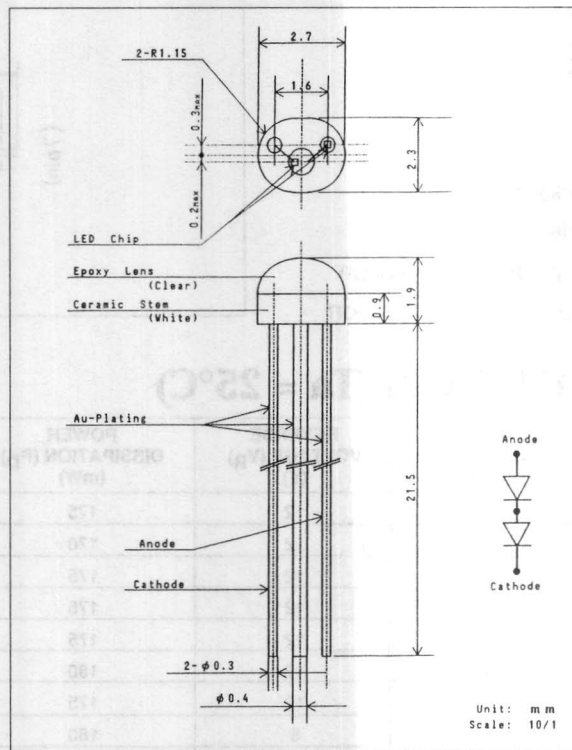
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# Multi-Chip LED Lamps

## FEATURES

- 2 chip series LED
- Ceramic stem package
- Wide viewing angle



## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
MT201SV-HR	15	8	60	-20~+60	-30~+100
MT201SV-PG	15	8	60	-20~+60	-30~+100
MT201SV-YL	15	8	60	-20~+60	-30~+100
MT201SV-SO	15	8	60	-20~+60	-30~+100
MT201SV-UR	15	8	60	-20~+60	-30~+100
MT201SV-UG	15	8	60	-20~+60	-30~+100
MT201SV-ER	14.5	8	58	-20~+60	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

PART NO.	MATERIAL	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)		REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)
		min.	typ.	@mA	typ.	@mA	$\mu\text{A}$	$V_r$		
MT201SV-HR	GaAsP/GaP	5	9	10	4	10	100	8	630	30
MT201SV-PG	GaP	2	4	10	4	10	100	8	557	30
MT201SV-YL	GaAsP/GaP	3	5	10	4	10	100	8	585	30
MT201SV-SO	GaAsP/GaP	4	7	10	4	10	100	8	615	30
MT201SV-UR	GaAlAs/GaAs	7	14	10	4	10	100	8	660	30
MT201SV-UG	GaP	9	17	10	4	10	100	8	565	30
MT201SV-ER	GaAlAs/GaAlAs	24	47	10	4	10	100	8	660	25

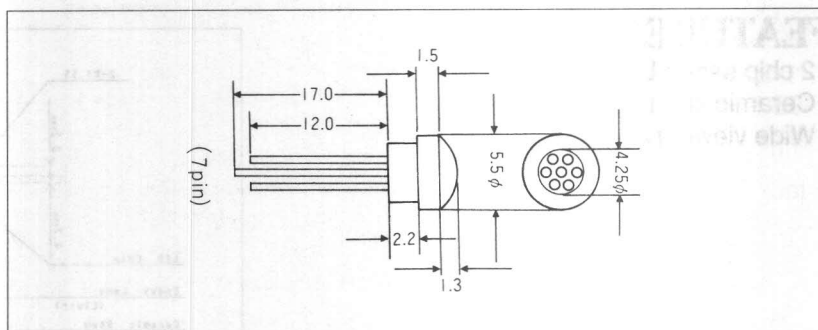
# Multi-Chip LED Lamps

## MT121L-XX

## MT131L-XX

### Features

- 6 chip LED lamp
- Ceramic stem package
- Wide viewing angle
- MT121L-XX: dual parallel connection
- MT131L-XX: three parallel connection



## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
MT121L-HR	35	12	175	-20~+60	-30~+100
MT121L-PG	30	12	170	-20~+60	-30~+100
MT121L-YL	35	12	175	-20~+60	-30~+100
MT121L-SO	35	12	175	-20~+60	-30~+100
MT121L-UR	36	12	175	-20~+60	-30~+100
MT121L-UG	32	12	180	-20~+60	-30~+100
MT121L-ER	36	12	175	-20~+60	-30~+100
MT131L-HR	51	8	180	-20~+60	-30~+100
MT131L-PG	45	8	170	-20~+60	-30~+100
MT131L-YL	51	8	180	-20~+60	-30~+100
MT131L-SO	51	8	180	-20~+60	-30~+100
MT131L-UR	54	8	175	-20~+60	-30~+100
MT131L-UG	48	8	180	-20~+60	-30~+100
MT131L-ER	54	8	175	-20~+60	-30~+100

## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

PART NO.	MATERIAL	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)		REVERSE CURRENT		PEAK WAVELENGTH	SPEC. LINE HALF WIDTH
		min.	typ.	@mA	typ.	@mA	$\mu\text{A}$	$V_r$	nm	nm
MT121L-HR	GaAsP/GaP	12	25	20	5.0	20	200	12	630	30
MT121L-PG	GaP	5	10	20	5.7	20	200	12	557	30
MT121L-YL	GaAsP/GaP	7	15	20	5.0	20	200	12	585	30
MT121L-SO	GaAsP/GaP	10	20	20	5.0	20	200	12	615	30
MT121L-UR	GaAlAs/GaAs	20	40	20	4.9	20	200	12	660	30
MT121L-UG	GaP	25	50	20	5.7	20	200	12	565	30
MT121L-ER	GaAlAs/GaAlAs	70	140	20	4.9	20	200	12	660	25
MT131L-HR	GaAsP/GaP	12	25	30	3.6	30	300	8	630	30
MT131L-PG	GaP	5	10	30	3.8	30	300	8	557	30
MT131L-YL	GaAsP/GaP	7	15	30	3.6	30	300	8	585	30
MT131L-SO	GaAsP/GaP	10	20	30	3.6	30	300	8	615	30
MT131L-UR	GaAlAs/GaAs	20	40	30	3.3	30	300	8	660	30
MT131L-UG	GaP	25	50	30	3.8	30	300	8	565	30
MT131L-ER	GaAlAs/GaAlAs	70	140	30	3.3	30	300	8	660	25



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# Packaged LEDs/PCB Mount

## FEATURES

- T-1-3/4 right angle PCB Mount LED
- Diffused lens
- Stackable end to end

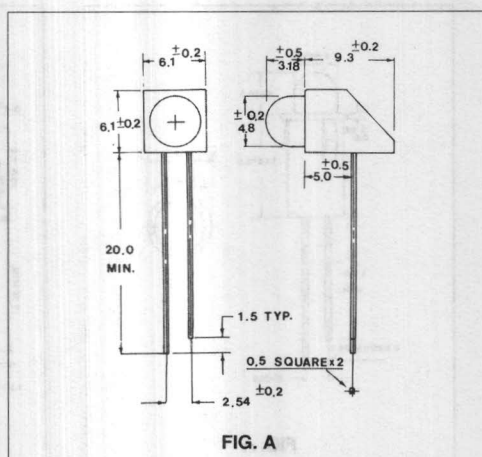


FIG. A

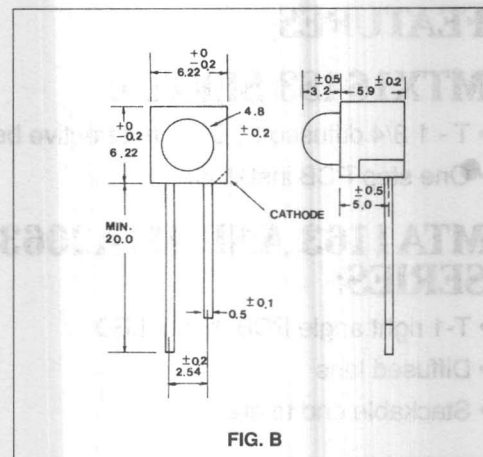


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (VR) (V)	POWER DISSIPATION (PD) (mW)	OPERATING TEMPERATURE (Topr) (°C)	STORAGE TEMPERATURE (Tstg) (°C)
A	MT1164-RCT	30	3	100	-25~+60	-25~+60
A	MT1164-RGCT	30	5	85	-25~+60	-25~+60
A	MT2164-GCT	30	5	85	-25~+60	-25~+60
A	MT3164-YCT	30	5	85	-25~+60	-25~+60
A	MT4164-OCT	30	5	85	-25~+60	-25~+60
A	MT4164-HRCT	30	5	85	-25~+60	-25~+60
B	MT1164S2-R	30	3	100	-25~+60	-25~+60
B	MT1164S2-RG	30	5	85	-25~+60	-25~+60
B	MT2164S2-G	30	5	85	-25~+60	-25~+60
B	MT3164S2-Y	30	5	85	-25~+60	-25~+60
B	MT4164S2-O	30	5	85	-25~+60	-25~+60
B	MT4164S2-HR	30	5	85	-25~+60	-25~+60

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	
A	MT1164-RCT	GaAsP/GaAs	Red Diff	38°	.5	1.2	10	1.7	2.0	20	100	3	655
A	MT1164-RGCT	GaP/GaP	Red Diff	38°	.7	1.8	10	2.1	3.0	20	100	5	700
A	MT2164-GCT	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
A	MT3164-YCT	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
A	MT4164-OCT	GaAsP/GaP	Orange Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
A	MT4164-HRCT	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
B	MT1164S2-R	GaAsP/GaAs	Red Diff	36°	.5	1.2	10	1.7	2.0	20	100	3	655
B	MT1164S2-RG	GaP/GaP	Red Diff	36°	.7	1.8	10	2.1	3.0	20	100	5	700
B	MT2164S2-G	GaP/GaP	Green Diff	36°	3.6	8.9	10	2.1	3.0	20	100	5	567
B	MT3164S2-Y	GaAsP/GaP	Yellow Diff	36°	2.9	7.3	10	2.1	3.0	20	100	5	585
B	MT4164S2-O	GaAsP/GaP	Orange Diff	36°	4.1	10.3	10	2.1	3.0	20	100	5	635
B	MT4164S2-HR	GaAsP/GaP	Red Diff	36°	4.1	10.3	10	2.1	3.0	20	100	5	635



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# Packaged LEDS/PCB Mount Indicators

## FEATURES

- T-1-3/4 right angle PCB mount LED
- Diffused lens
- Stackable end to end
- MTA2264-YG features two yellow and two green LEDs.

MTA2264-HRG features two red and two green LEDs.

Single and multiple color combinations are also available.

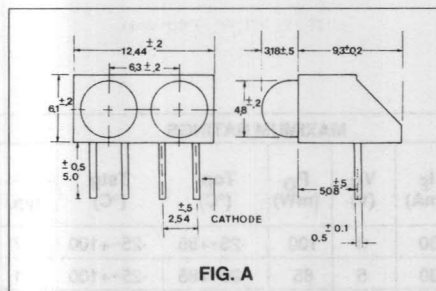


FIG. A

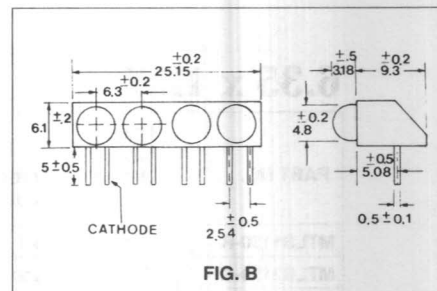


FIG. B

## MAXIMUM RATINGS (Ta = 25°C)

FIG	PART NO.	FORWARD CURRENT (If) (mA)	REVERSE VOLTAGE (Vr) (V)	POWER DISSIPATION (Pd) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
A	MTA1164-YG (Y)	30	5	85	-25~+60	-25~+60
	(G)	30	5	85	-25~+60	-25~+60
A	MTA1164-HRG (HR)	30	5	85	-25~+60	-25~+60
	(G)	30	5	85	-25~+60	-25~+60
A	MTA2064-Y	30	5	85	-25~+60	-25~+60
A	MTA2064-HR	30	5	85	-25~+60	-25~+60
A	MTA2064-G	30	5	85	-25~+60	-25~+60
B	MTA2264-YG (Y)	30	5	85	-25~+60	-25~+60
	(G)	30	5	85	-25~+60	-25~+60
B	MTA2264-HRG (HR)	30	5	85	-25~+60	-25~+60
	(G)	30	5	85	-25~+60	-25~+60
B	MTA4064-Y	30	5	85	-25~+60	-25~+60
B	MTA4064-HR	30	5	85	-25~+60	-25~+60
B	MTA4064-G	30	5	85	-25~+60	-25~+60

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

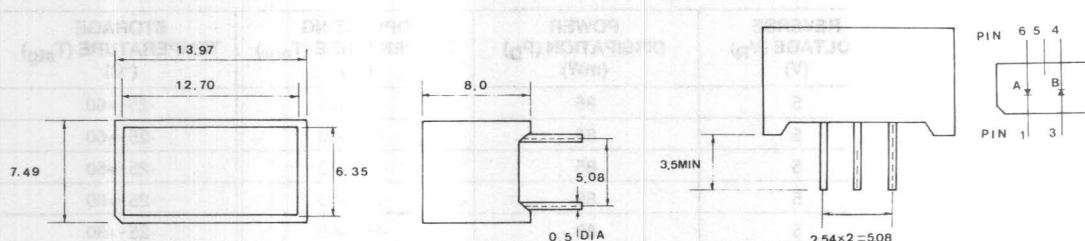
FIG	PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
				typ.	min.	typ.	@mA	typ.	max.	@mA	μA	Vr	nm
A	MTA1164-YG (Y)	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
	(G)	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
A	MTA1164-HRG (HR)	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
	(G)	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
A	MTA2064-Y	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
A	MTA2064-HR	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
A	MTA2064-G	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
B	MTA2264-YG (Y)	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
	(G)	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
B	MTA2264-HRG (HR)	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
	(G)	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567
B	MTA4064-Y	GaAsP/GaP	Yellow Diff	38°	2.9	7.3	10	2.1	3.0	20	100	5	585
B	MTA4064-HR	GaAsP/GaP	Red Diff	38°	4.1	10.3	10	2.1	3.0	20	100	5	635
B	MTA4064-G	GaP/GaP	Green Diff	38°	3.6	8.9	10	2.1	3.0	20	100	5	567



# Light Bars

## 6.35 x 12.7mm

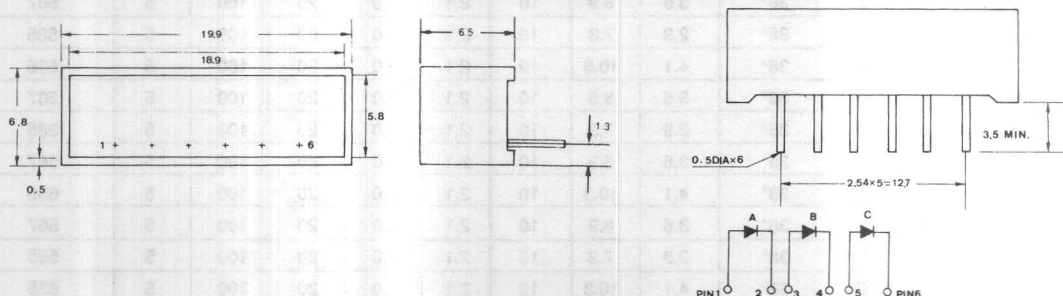
PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS						
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)	
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA
MTLB1150-R	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	800	10
MTLB2150-G	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	4000	10
MTLB3150-Y	585	Yellow	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3280	10
MTLB4150-O	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	4640	10
MTLB4150-HR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	4640	10
MTLB5150-RG	700	GaP Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	1200	10



PIN NO.	FUNCTION
1.	A CATHODE
2.	NO PIN
3.	B ANODE
4.	B CATHODE
5.	NO CONNECTION
6.	A ANODE

## 5.8 x 18.9mm

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS						
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)	
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA
MTLB1175-R	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	900	10
MTLB2175-G	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	4500	10
MTLB3175-Y	585	Yellow	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3690	10
MTLB4175-O	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5220	10
MTLB4175-HR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5220	10
MTLB5175-RG	700	GaP Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	1350	10



PIN NO.	FUNCTION
1.	ANODE A
2.	CATHODE A
3.	ANODE B
4.	CATHODE B
5.	ANODE C
6.	CATHODE C



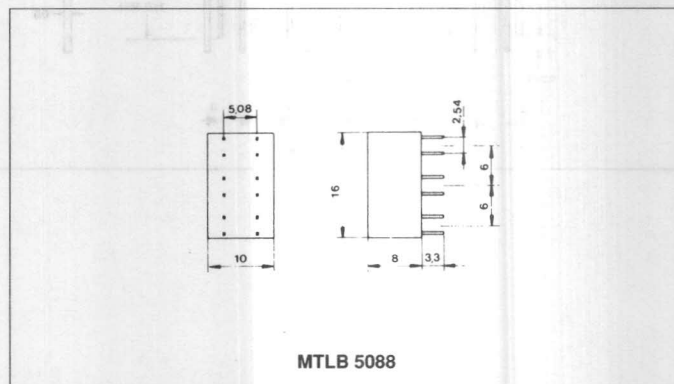
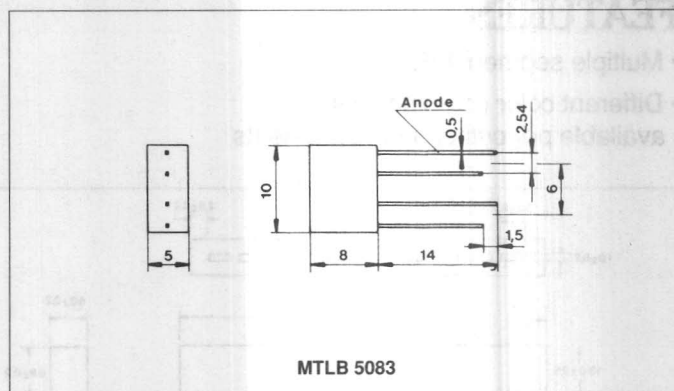
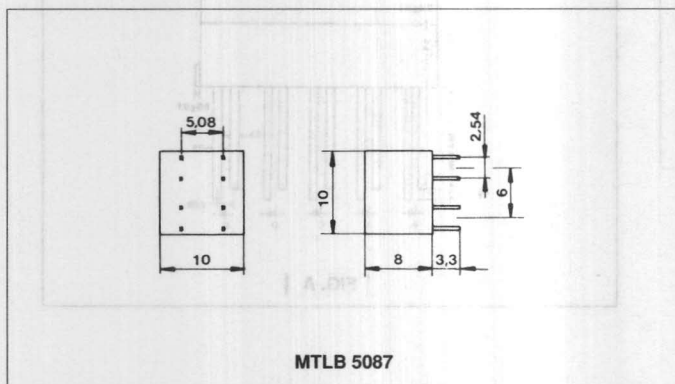
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# Light Bars

## FEATURES

- Plastic mold type
- Suitable as a backlight lamp
- Low drive current, uniform light emission
- Fast response time



PART NO.	MATERIAL	PEAK WAVE-LENGTH (nm)	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS						
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (I <sub>F</sub> @20 mA) (V)		I <sub>R</sub> (μA)	V <sub>R</sub> (V)	I <sub>y</sub> (per seq.) (mcd)*		SPECTRAL LINE HALF WIDTH (nm)
								min.	typ.			min.	typ.	
MTLB5083-HR	GaAsP/GaP	625	30	5.0	105	-40~+85	-40~+85	2.0	2.5	10	5	1.25	5.0	45
MTLB5083-G	GaP	565	25	5.0	105	-40~+85	-40~+85	2.2	2.5	10	5	1.25	5.0	30
MTLB5083-Y	GaAsP/GaP	590	30	5.0	105	-40~+85	-40~+85	2.1	2.5	10	5	1.25	5.0	35
MTLB5087-HR	GaAsP/GaP	625	30	5.0	105	-40~+85	-40~+85	2.0	2.5	10	5	2.0	8.0	45
MTLB5087-G	GaP	565	25	5.0	105	-40~+85	-40~+85	2.2	2.5	10	5	1.25	5.0	30
MTLB5087-Y	GaAsP/GaP	590	30	5.0	105	-40~+85	-40~+85	2.1	2.5	10	5	2.0	8.0	35
MTLB5088-HR	GaAsP/GaP	625	30	5.0	105	-40~+85	-40~+85	2.0	2.5	10	5	2.0	8.0	45
MTLB5088-G	GaP	565	25	5.0	105	-40~+85	-40~+85	2.2	2.5	10	5	1.25	5.0	30
MTLB5088-Y	GaAsP/GaP	590	30	5.0	105	-40~+85	-40~+85	2.1	2.5	10	5	2.0	8.0	35

\*I<sub>F</sub>@10mA

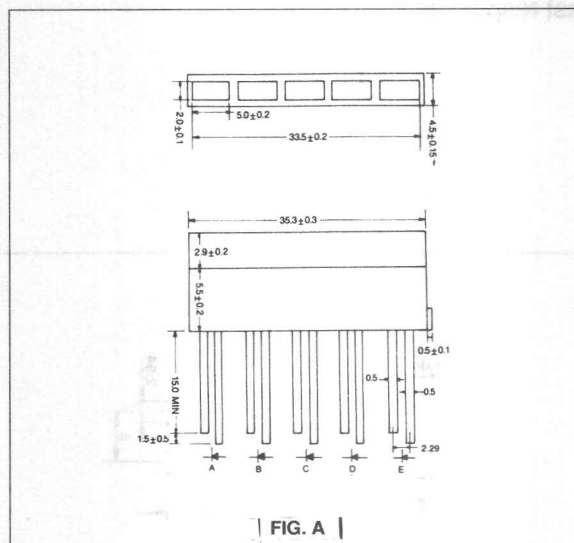
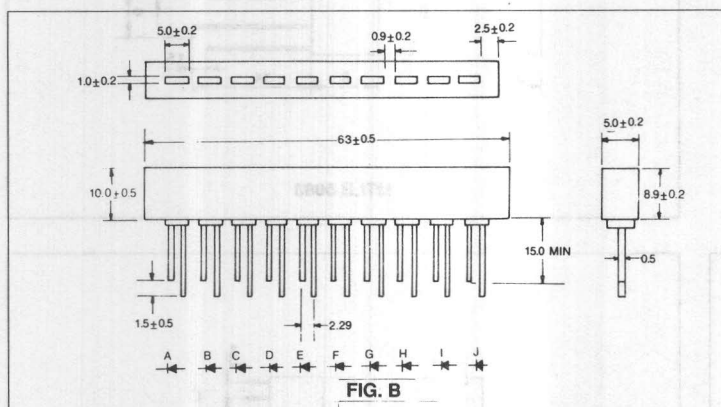


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# LED Lamp Arrays

## FEATURES

- Multiple segment LED array
- Different color combinations available per customer requirements



## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

FIG	PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
A	MTA2050-R	20	4	54	-20~+60	-20~+75
A	MTA4050-Y	30	4	81	-20~+60	-20~+75
A	MTA5050-G	25	4	68	-20~+60	-20~+75
B	MTA8010-G	25	4	68	-20~+60	-20~+75
B	MTA8010-R	20	4	54	-20~+60	-20~+75

## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

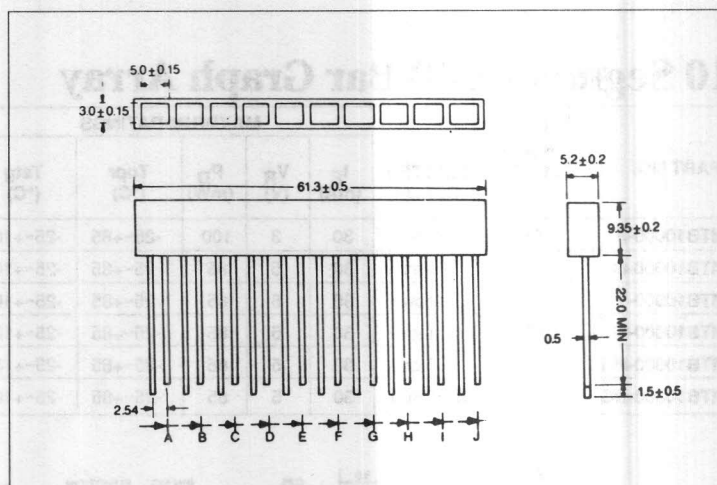
FIG	PART NO.	MATERIAL	LENS COLOR	LUMINOUS INTENSITY (mcd/seg.)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC LINE HALF WIDTH (nm)
				min.	typ.	@mA	typ.	max.	@mA	$\mu\text{A}$	$V_r$		
A	MTA2050-R	GaP/GaP	Red Diff	-	.3	20	2.1	2.7	20	10	3	700	90
A	MTA4050-Y	GaAsP/GaP	Yellow Diff	-	1.0	20	2.1	2.7	20	10	3	585	35
A	MTA5050-G	GaP/GaP	Green Diff	-	.8	20	2.1	2.7	20	10	3	560	30
B	MTA8010-G	GaP/GaP	Green Diff	-	1.8	20	2.1	2.7	20	10	3	560	30
B	MTA8010-R	GaP/GaP	Red Diff	-	1.0	20	2.1	2.7	20	10	3	700	90



# LED Lamp Arrays

## FEATURES

- 10 segment LED array
- Different color combinations available per customer requirements



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MTA3010-R	20	4	54	-20~+60	-20~+75
MTA3010-Y	30	4	81	-20~+60	-20~+75
MTA3010-G	25	4	68	-20~+60	-20~+75

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	LUMINOUS INTENSITY (mcd/seg.)			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH (nm)	SPEC. LINE HALF WIDTH (nm)
			min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>		
MTA3010-R	GaP/GaP	Red Diff	-	.8	20	2.1	2.7	20	10	3	700	90
MTA3010-Y	GaAsP/GaP	Yellow Diff	-	2.0	20	2.1	2.7	20	10	3	585	35
MTA3010-G	GaP/GaP	Green Diff	-	3.0	20	2.1	2.7	20	10	3	560	30



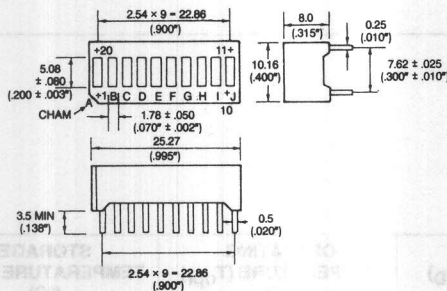
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# LED Lamp Arrays

## 10 Segment LED Bar Graph Array

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS						
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)	
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA
MTB10000-R	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10
MTB10000-G	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10
MTB10000-Y	585	Yellow	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2050	10
MTB10000-O	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10
MTB10000-HR	635	Hi-Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10
MTB10000-RG	700	GaP Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	750	10

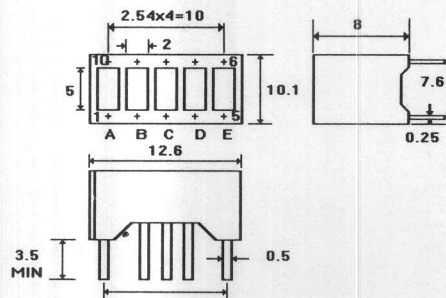


PIN NO.	FUNCTION
1.	A ANODE
2.	B ANODE
3.	C ANODE
4.	D ANODE
5.	E ANODE
6.	F ANODE
7.	G ANODE
8.	H ANODE
9.	I ANODE
10.	J ANODE
11.	J CATHODE
12.	I CATHODE
13.	H CATHODE
14.	G CATHODE
15.	F CATHODE
16.	E CATHODE
17.	D CATHODE
18.	C CATHODE
19.	B CATHODE
20.	A CATHODE

NOTE: Pin 1 is designated by the following:  
 A) Cham on left corner of bar array.  
 B) Left side of face containing device part number.

## 5 Segment LED Bar Graph Array

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS						
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>v</sub> (μcd)	
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA
MTB5000-R	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	560	10
MTB5000-G	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2800	10
MTB5000-Y	585	Yellow	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2290	10
MTB5000-O	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10
MTB5000-HR	635	Hi-Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10
MTB5000-RG	700	GaP Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	840	10



PIN NO.	FUNCTION
1.	A ANODE
2.	B ANODE
3.	C ANODE
4.	D ANODE
5.	E ANODE
6.	E CATHODE
7.	D CATHODE
8.	C CATHODE
9.	B CATHODE
10.	A CATHODE



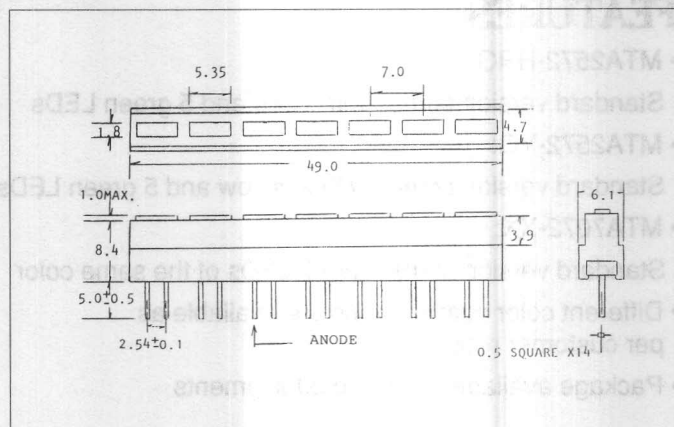
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# LED Lamp Arrays

## FEATURES

- MTA4320-YG:  
Standard version comes with 4 yellow and 3 green LEDs
- MTA4320-HRG:  
Standard version comes with 4 red and 3 green LEDs
- MTA7020-XX:  
Standard version comes with 7 LEDs of the same color
- Different color combinations are available as per customer requirements



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MTA4320-YG (Y)	30	5	85	-25~+60	-25~+60
(G)	30	5	85	-25~+60	-25~+60
MTA4320-HRG (HR)	30	5	85	-25~+60	-25~+60
(G)	30	5	85	-25~+60	-25~+60
MTA7020-Y	30	5	85	-25~+60	-25~+60
MTA7020-HR	30	5	85	-25~+60	-25~+60
MTA7020-G	30	5	85	-25~+60	-25~+60

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)/seg.			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.									
MTA4320-YG (Y)	GaAsP/GaP	Yellow Diff	52°	1.0	2.5	10	2.1	3.0	20	100	5	585
(G)	GaP	Green Diff	52°	1.2	3.1	10	2.1	3.0	20	100	5	567
MTA4320-HRG (HR)	GaAsP/GaP	Red Diff	52°	1.4	3.6	10	2.1	3.0	20	100	5	635
(G)	GaP	Green Diff	52°	1.2	3.1	10	2.1	3.0	20	100	5	567
MTA7020-Y	GaAsP/GaP	Yellow Diff	52°	1.0	2.5	10	2.1	3.0	20	100	5	585
MTA7020-HR	GaAsP/GaP	Red Diff	52°	1.4	3.6	10	2.1	3.0	20	100	5	635
MTA7020-G	GaP	Green Diff	52°	1.2	3.1	10	2.1	3.0	20	100	5	567



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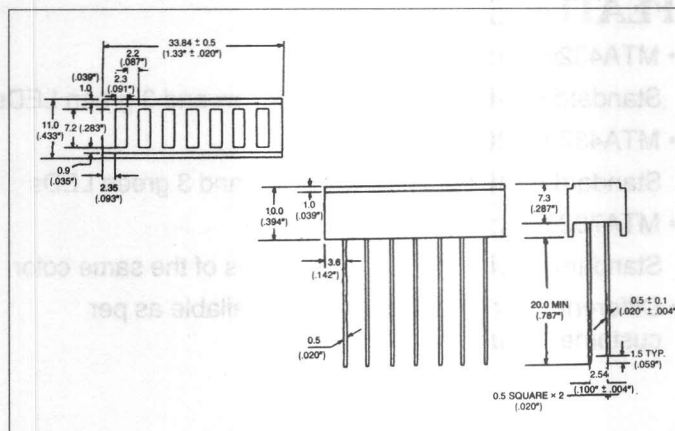
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# LED Lamp Arrays

## FEATURES

- MTA2572-HRG:  
Standard version comes with 2 red and 5 green LEDs
- MTA2572-YG:  
Standard version comes with 2 yellow and 5 green LEDs
- MTA7072-XX:  
Standard version comes with 7 LEDs of the same color
- Different color combinations are available as per customer requirements
- Package available from 7 to 20 segments



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MTA2572-HRG (HR)	30	5	85	-25~+60	-25~+60
(G)	30	5	85	-25~+60	-25~+60
MTA2572-YG (Y)	30	5	85	-25~+60	-25~+60
(G)	30	5	85	-25~+60	-25~+60
MTA7072-G	30	5	85	-25~+60	-25~+60
MTA7072-Y	30	5	85	-25~+60	-25~+60
MTA7072-HR	30	5	85	-25~+60	-25~+60

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd) /seg.			FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA	typ.	max.	@mA	μA	V <sub>r</sub>	nm
MTA2572-HRG (HR)	GaAsP/GaP	Red Diff	48°	1.3	3.2	10	2.1	3.0	20	100	5	635
(G)	GaP/GaP	Green Diff	48°	1.1	2.7	10	2.1	3.0	20	100	5	567
MTA2572-YG (Y)	GaAsP/GaP	Yellow Diff	48°	0.9	2.2	10	2.1	3.0	20	100	5	585
(G)	GaP/GaP	Green Diff	48°	1.1	2.7	10	2.1	3.0	20	100	5	567
MTA7072-G	GaP/GaP	Green Diff	48°	1.1	2.7	10	2.1	3.0	20	100	5	567
MTA7072-Y	GaAsP/GaP	Yellow Diff	48°	0.9	2.2	10	2.1	3.0	20	100	5	585
MTA7072-HR	GaAsP/GaP	Red Diff	48°	1.3	3.2	10	2.1	3.0	20	100	5	635



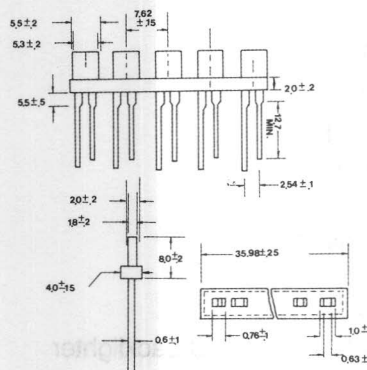
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# LED Lamp Arrays

## FEATURES

- 1.8x5.3mm rectangular LEDs in an array
- All plastic mold type
- Diffused lens



## MAXIMUM RATINGS (Ta = 25°C)

PART NO.	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
MTA1188-R	30	3	100	-25~+85	-25~+100
MTA1188-RG	30	5	85	-25~+85	-25~+100
MTA2188-G	30	5	85	-25~+85	-25~+100
MTA3188-Y	30	5	85	-25~+85	-25~+100
MTA4188-O	30	5	85	-25~+85	-25~+100
MTA4188-HR	30	5	85	-25~+85	-25~+100

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	MATERIAL	LENS COLOR	VIEWING ANGLE	LUMINOUS INTENSITY (mcd)				FORWARD VOLTAGE (V)			REVERSE CURRENT		PEAK WAVELENGTH
			typ.	min.	typ.	@mA		typ.	max.	@mA	μA	V <sub>r</sub>	nm
MTA1188-R	GaAsP	Red Diff	76°	0.2	0.6	10		1.7	2.0	20	100	3	655
MTA1188-RG	GaP	Red Diff	76°	0.4	0.9	10		2.1	3.0	20	100	5	700
MTA2188-G	GaP	Green Diff	76°	0.9	2.3	10		2.1	3.0	20	100	5	567
MTA3188-Y	GaAsP/GaP	Yellow Diff	76°	0.8	1.9	10		2.1	3.0	20	100	5	585
MTA4188-O	GaAsP/GaP	Orange Diff	76°	1.1	2.7	10		2.1	3.0	20	100	5	635
MTA4188-HR	GaAsP/GaP	Red Diff	76°	1.1	2.7	10		2.1	3.0	20	100	5	635



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# LED Luminators

## FEATURES

- Uniform brightness
- No heat dissipation
- Sturdy mechanical support
- Low power consumption
- Improves contrast
- Custom designs available

## APPLICATIONS

- Transmissive or transreflective LCD backlighter
- Membrane switch backlighter
- Large surface indicator

## DESCRIPTION:

The LED Luminator is composed of a series of side viewing light emitting diodes strategically placed on the ends of a specially designed molded unit. Maximum light output and uniformity is obtained due to the specially treated edges. Utilizing an LED background behind the LCD unit greatly enhances its contrast in both high and low ambient light conditions.

In addition, LEDs offer significant advantages over both incandescent and fluorescent backlighters including no heat dissipation, reduced power consumption, and shock resistance. Another important advantage is the sturdy mechanical support this unit provides for the LCD.

## MAXIMUM RATINGS (Ta = 25°C)

EMMITTED COLOR	FORWARD CURRENT (I <sub>F</sub> ) (mA)	REVERSE VOLTAGE (V <sub>R</sub> ) (V)	POWER DISSIPATION (P <sub>D</sub> ) (mW)	OPERATING TEMPERATURE (T <sub>opr</sub> ) (°C)	STORAGE TEMPERATURE (T <sub>stg</sub> ) (°C)
RG, G, Y, HR, A	30	10	85	-25~+85	-25~+85
UR	30	6	70	-25~+85	-25~+85

Note: All values are per element.

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

EMMITTED COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			PEAK WAVELENGTH (nm)
	min.	typ.	@mA	typ.	max.	@mA	
GaP Red (RG)	4.2	7.0	10	4.2	6.0	20	700
Green (G)	6.6	11.0	10	4.2	6.0	20	567
Yellow (Y)	6.0	10.0	10	4.2	6.0	20	585
Hi-Eff Red/Orange (HR)	7.5	12.5	10	4.2	6.0	20	635
Amber (A)	7.5	12.5	10	4.2	6.0	20	610
Ultra Bright Red (UR)	45.6	76.0	10	3.4	4.4	20	660

\* IV(mcd/element)

To determine part number: MTBL  $\frac{x}{1} \frac{41}{2} \frac{x}{3} \frac{xxx}{4}$

1-Emitting color - 1: GaP Red, 2: Green, 3: Yellow, 4: High-Eff. Red/Orange, A: Amber, 7: Ultra Bright Red

2-Package style - 1, 2, 3 or 4 (see following page for drawings)

3-Color - RG, G, Y, HR, O, UR, A

4-LED Element No.: 01, 02, 03, ..., 14



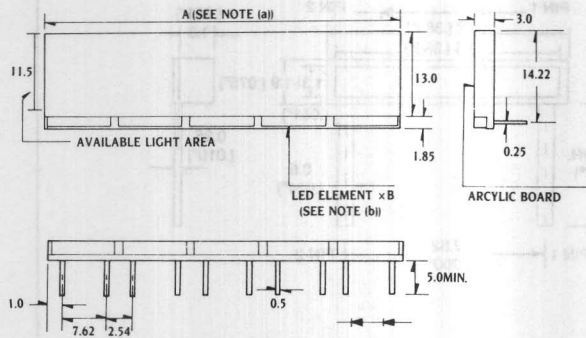
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# LED Luminators

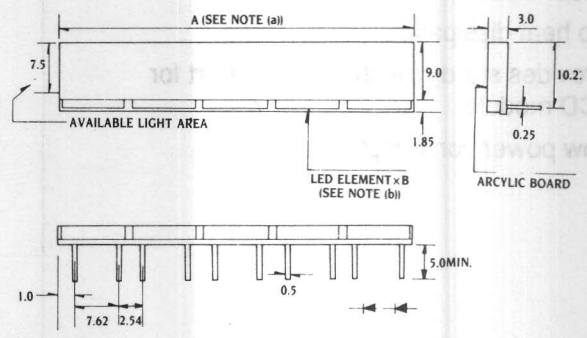
**MTBLX411-XXX**



NOTE:

- (a) "A" CAN BE DETERMINED BY THE FOLLOWING  
 FORMULA  $A = 9.62 + N \times 10.16$  (N=0,1.....14)  
 (b)  $N=B-1$  where B=# of LED's used

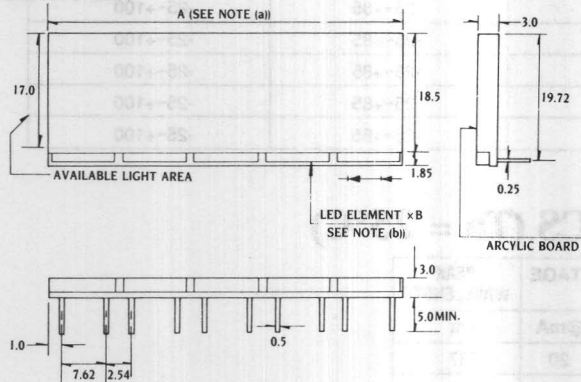
**MTBLX412-XXX**



NOTE:

- (a) "A" CAN BE DETERMINED BY THE FOLLOWING  
 FORMULA  $A = 9.62 + N \times 10.16$  (N=0,1,2..... 9)  
 (b)  $N=B-1$  where B=# of LED's used

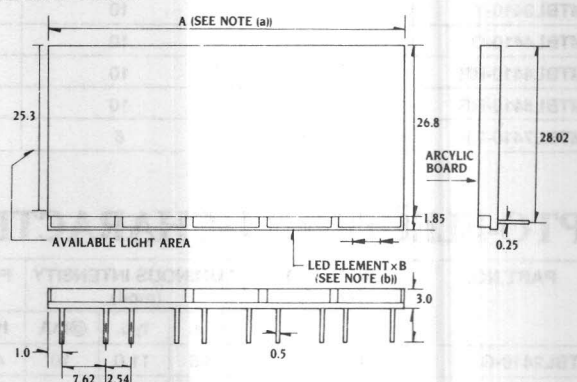
**MTBLX413-XXX**



NOTE:

- (a) "A" CAN BE DETERMINED BY THE FOLLOWING  
 FORMULA  $A = 9.62 + N \times 10.16$  (N=0,1,2.....14)  
 (b)  $N=B-1$  where B=# of LED's used

**MTBLX414-XXX**



NOTE:

- (a) "A" CAN BE DETERMINED BY THE FOLLOWING  
 FORMULA  $A = 9.62 + N \times 10.16$  (N=0,1,2.....14)  
 (b)  $N=B-1$  where B=# of LED's used



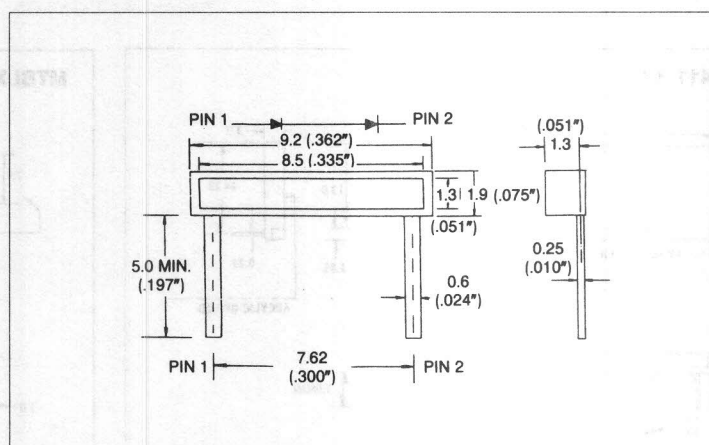
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# LED Luminators

## FEATURES

- Thin package style for easy insertion under LCD's
- No heat dissipation
- Provides sturdy mechanical support for LCD module
- Low power consumption



## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PART NO.	FORWARD CURRENT ( $I_F$ ) (mA)	REVERSE VOLTAGE ( $V_R$ ) (V)	POWER DISSIPATION ( $P_D$ ) (mW)	OPERATING TEMPERATURE ( $T_{opr}$ ) ( $^\circ\text{C}$ )	STORAGE TEMPERATURE ( $T_{stg}$ ) ( $^\circ\text{C}$ )
MTBL2410-G	30	10	85	-25~+85	-25~+100
MTBL3410-Y	30	10	85	-25~+85	-25~+100
MTBL4410-O	30	10	85	-25~+85	-25~+100
MTBL4410-HR	30	10	85	-25~+85	-25~+100
MTBL5410-RG	30	10	85	-25~+85	-25~+100
MTBL7410-UR	30	6	70	-25~+85	-25~+100

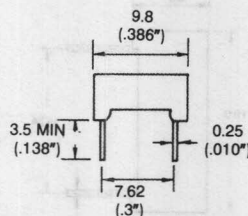
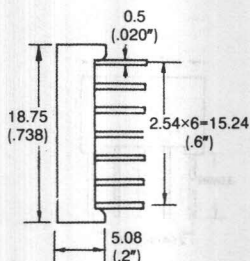
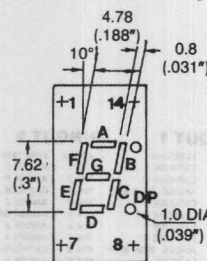
## OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

PART NO.	EMMITTED COLOR	LUMINOUS INTENSITY (mcd)			FORWARD VOLTAGE (V)			PEAK WAVELENGTH (nm)
		min.	typ.	@mA	typ.	max.	@mA	
MTBL2410-G	Green	6.6	11.0	10	4.2	6.0	20	567
MTBL3410-Y	Yellow	6.0	10.0	10	4.2	6.0	20	585
MTBL4410-O	Amber	7.5	12.5	10	4.2	6.0	20	610
MTBL4410-HR	Hi-Eff Red/Orange	7.5	12.5	10	4.2	6.0	20	635
MTBL5410-RG	GaP Red	4.2	7.0	10	4.2	6.0	20	700
MTBL7410-UR	Ultra Bright Red	45.6	76.0	10	3.4	4.4	20	660

# Single Digit Seven Segment Display

## 0.3" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1130-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN2130-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN4130-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN4130-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7130-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1
MTN1130-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN2130-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN4130-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN4130-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7130-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2



### PINOUT 1

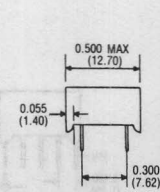
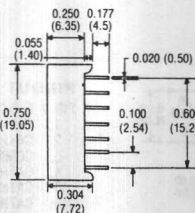
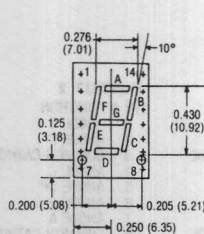
PIN NO.	FUNCTION
1.	A CATHODE
2.	F CATHODE
3.	COMMON ANODE
4.	NO PIN
5.	NO PIN
6.	NO CONNECTION
7.	E CATHODE
8.	D CATHODE
9.	DP CATHODE
10.	C CATHODE
11.	G CATHODE
12.	NO PIN
13.	B CATHODE
14.	COMMON ANODE

### PINOUT 2

PIN NO.	FUNCTION
1.	F ANODE
2.	G ANODE
3.	NO PIN
4.	COMMON CATHODE
5.	NO PIN
6.	E ANODE
7.	D ANODE
8.	C ANODE
9.	DP ANODE
10.	NO PIN
11.	NO PIN
12.	COMMON CATHODE
13.	B ANODE
14.	A ANODE

## 0.43" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1143-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	1
MTN2143-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	1
MTN4143-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN4143-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN7143-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	1
MTN1143-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	2
MTN2143-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	2
MTN4143-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN4143-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN7143-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	2



### PINOUT 1

PIN #	FUNCTION
1.	CATHODE A
2.	CATHODE F
3.	COMMON ANODE
4.	NO PIN
5.	NO PIN
6.	CATHODE LHDP
7.	CATHODE E
8.	CATHODE D
9.	CATHODE RHDP
10.	CATHODE C
11.	CATHODE G
12.	NO PIN
13.	CATHODE B
14.	COMMON ANODE

### PINOUT 2

PIN #	FUNCTION
1.	ANODE A
2.	ANODE F
3.	COMMON CATHODE
4.	NO PIN
5.	NO PIN
6.	ANODE LHDP
7.	ANODE E
8.	ANODE D
9.	ANODE RHDP
10.	ANODE C
11.	ANODE G
12.	NO PIN
13.	ANODE B
14.	COMMON CATHODE



**marktech**

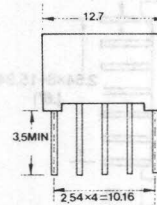
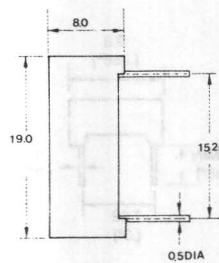
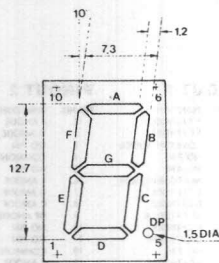
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# Single Digit Seven Segment Display

## 0.5" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1150-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	
MTN2150-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	1
MTN4150-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN4150-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN7150-AUR	660	Ultra-Eff Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	1
MTN1150-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	2
MTN2150-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	2
MTN4150-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN4150-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN7150-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	2



### PINOUT 1

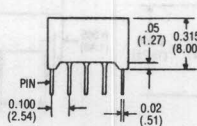
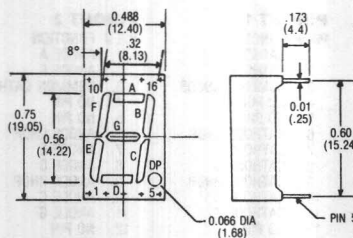
PIN NO.	FUNCTION
PIN 1	CATHODE E
PIN 2	CATHODE D
PIN 3	ANODE, DIGIT & DP
PIN 4	CATHODE C
PIN 5	CATHODE DP
PIN 6	CATHODE B
PIN 7	CATHODE A
PIN 8	ANODE, DIGIT & DP
PIN 9	CATHODE F
PIN 10	CATHODE G

### PINOUT 2

PIN NO.	FUNCTION
PIN 1	ANODE E
PIN 2	ANODE D
PIN 3	CATHODE, DIGIT & DP
PIN 4	ANODE C
PIN 5	ANODE DP
PIN 6	ANODE B
PIN 7	ANODE A
PIN 8	CATHODE, DIGIT & DP
PIN 9	ANODE F
PIN 10	ANODE G

## 0.56" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1156-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN2156-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN4156-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN4156-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7156-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1
MTN1156-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN2156-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN4156-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN4156-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7156-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2



### PINOUT 1

PIN #	FUNCTION
1.	CATHODE E
2.	CATHODE D
3.	COMMON ANODE
4.	CATHODE C
5.	CATHODE DP
6.	CATHODE B
7.	CATHODE A
8.	COMMON ANODE
9.	CATHODE F
10.	CATHODE G

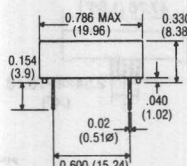
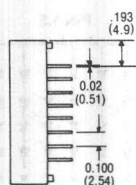
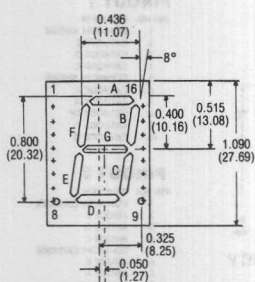
### PINOUT 2

PIN #	FUNCTION
1.	ANODE E
2.	ANODE D
3.	COMMON CATHODE
4.	ANODE C
5.	ANODE DP
6.	ANODE B
7.	ANODE A
8.	COMMON CATHODE
9.	ANODE F
10.	ANODE G

# Single Digit Seven Segment Display

## 0.8" DIGIT SIZE - R.H./L.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1180-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	650	10	1
MTN2180-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3250	10	1
MTN4180-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	1
MTN4180-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	1
MTN7180-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	14700	10	1
MTN1180-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	650	10	2
MTN2180-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3250	10	2
MTN4180-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	2
MTN4180-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	2
MTN7180-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	14700	10	2



### PINOUT 1

PIN #	FUNCTION
1.	CATHODE A
2.	CATHODE F
3.	COMMON ANODE
4.	CATHODE E
5.	COMMON ANODE
6.	CATHODE LHDP
7.	NO PIN
8.	NO PIN
9.	CATHODE RHDP
10.	CATHODE D
11.	COMMON ANODE
12.	CATHODE C
13.	CATHODE B
14.	CATHODE B
15.	NO PIN
16.	COMMON ANODE

PINS 3, 5, 11 & 16.  
INTERNALLY CONNECTED

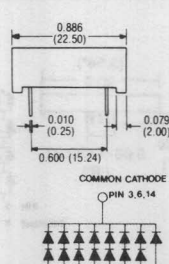
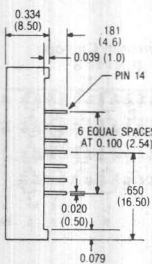
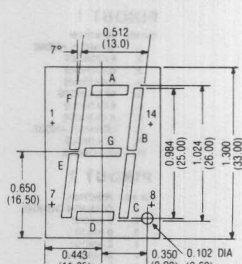
### PINOUT 2

PIN #	FUNCTION
1.	ANODE A
2.	ANODE F
3.	COMMON CATHODE
4.	ANODE E
5.	COMMON CATHODE
6.	ANODE LHDP
7.	NO PIN
8.	NO PIN
9.	ANODE RHDP
10.	ANODE D
11.	COMMON CATHODE
12.	ANODE C
13.	ANODE G
14.	ANODE B
15.	NO PIN
16.	COMMON CATHODE

PINS 3, 5, 11 & 16.  
INTERNALLY CONNECTED

## 1.02" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1126-ASR	655	Red	30	3	100	-25~+85	-25~+100	3.4	4.0	20	100	3	500	10	1
MTN2126-AG	567	Green	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2500	10	1
MTN4126-AO	635	Orange	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2900	10	1
MTN4126-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2900	10	1
MTN7126-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	3.4	4.4	20	100	4	11300	10	1
MTN1126-CSR	655	Red	30	3	100	-25~+85	-25~+100	3.4	4.0	20	100	3	500	10	2
MTN2126-CG	567	Green	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2500	10	2
MTN4126-CO	635	Orange	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2900	10	2
MTN4126-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	4.2	6.0	20	100	5	2900	10	2
MTN7126-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	3.4	4.4	20	100	4	11300	10	2



### PINOUT 1

PIN #	FUNCTION
1.	CATHODE A
2.	CATHODE F
3.	COMMON ANODE
4.	OMITTED
5.	OMITTED
6.	COMMON ANODE
7.	CATHODE E
8.	CATHODE D
9.	CATHODE DP
10.	CATHODE C
11.	CATHODE G
12.	OMITTED
13.	CATHODE B
14.	COMMON ANODE

PINS 3, 6 & 14 ARE  
INTERNALLY CONNECTED

### PINOUT 2

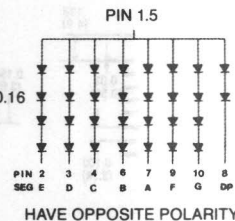
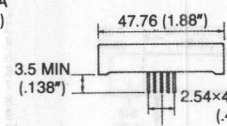
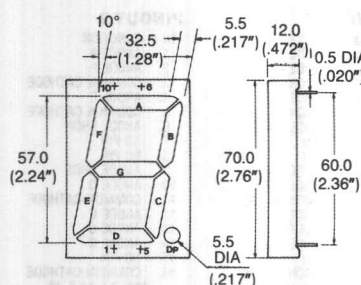
PIN #	FUNCTION
1.	ANODE A
2.	ANODE F
3.	COMMON CATHODE
4.	OMITTED
5.	OMITTED
6.	COMMON CATHODE
7.	ANODE E
8.	ANODE D
9.	ANODE DP
10.	ANODE C
11.	ANODE G
12.	OMITTED
13.	ANODE B
14.	COMMON CATHODE

PINS 3, 6 & 14 ARE  
INTERNALLY CONNECTED

# Single Digit Seven Segment Display

## 2.3" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1123-ASR	655	Red	30	3	100	-25~+85	-25~+100	6.8	8.0	20	100	3	500	10	1
MTN2123-AG	567	Green	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2500	10	1
MTN4123-AO	635	Orange	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2900	10	1
MTN4123-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2900	10	1
MTN7123-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	6.8	8.8	20	100	4	11300	10	1
MTN1123-CSR	655	Red	30	3	100	-25~+85	-25~+100	6.8	8.0	20	100	3	500	10	2
MTN2123-CG	567	Green	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2500	10	2
MTN4123-CO	635	Orange	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2900	10	2
MTN4123-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2900	10	2
MTN7123-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	6.8	8.8	20	100	4	11300	10	2



### PINOUT 1

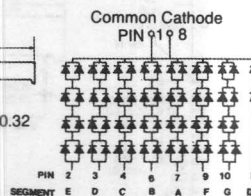
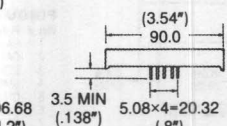
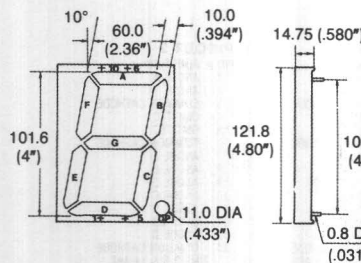
- PIN NO. FUNCTION
1. COMMON ANODE
  2. CATHODE E
  3. CATHODE D
  4. CATHODE C
  5. COMMON ANODE
  6. CATHODE B
  7. CATHODE A
  8. CATHODE DP
  9. CATHODE F
  10. CATHODE G

### PINOUT 2

- PIN NO. FUNCTION
1. COMMON CATHODE
  2. ANODE E
  3. ANODE D
  4. ANODE C
  5. COMMON CATHODE
  6. ANODE B
  7. ANODE A
  8. ANODE DP
  9. ANODE F
  10. ANODE G

## 4.0" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1141-ASR	655	Red	30	3	100	-25~+85	-25~+100	6.8	8.0	20	100	3	400	10	1
MTN2141-AG	567	Green	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2000	10	1
MTN4141-AO	635	Orange	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2320	10	1
MTN4141-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2320	10	1
MTN7141-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	6.8	8.8	20	100	4	9000	10	1
MTN1141-CSR	655	Red	30	3	100	-25~+85	-25~+100	6.8	8.0	20	100	3	400	10	2
MTN2141-CG	567	Green	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2000	10	2
MTN4141-CO	635	Orange	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2320	10	2
MTN4141-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	8.4	12.0	20	100	5	2320	10	2
MTN7141-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	6.8	8.8	20	100	4	9000	10	2



### PINOUT 1

- PIN NO. FUNCTION
1. COMMON ANODE
  2. E CATHODE
  3. D CATHODE
  4. C CATHODE
  5. DP CATHODE
  6. B CATHODE
  7. A CATHODE
  8. COMMON ANODE
  9. F CATHODE
  10. G CATHODE

### PINOUT 2

- PIN NO. FUNCTION
1. COMMON CATHODE
  2. E ANODE
  3. D ANODE
  4. C ANODE
  5. DP ANODE
  6. B ANODE
  7. A ANODE
  8. COMMON CATHODE
  9. F ANODE
  10. G ANODE



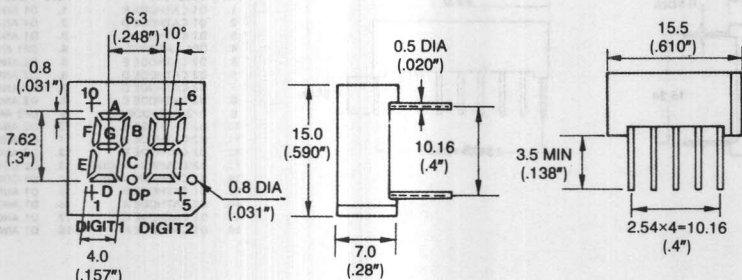
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# Dual Digit Seven Segment Display

## 0.3" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN3031-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN3033-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN3037-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN3037-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7230-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2
MTN3030-ASR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN3032-AG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN3036-AO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN3036-AHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7230-AUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1



### PINOUT 1

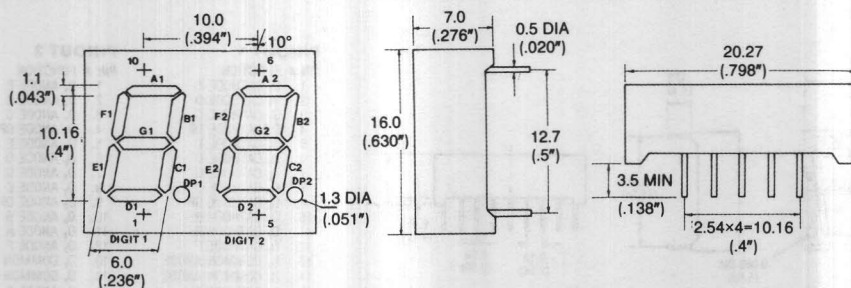
PIN NO.	FUNCTION
1.	G CATHODE
2.	NO PIN
3.	A CATHODE
4.	F CATHODE
5.	DIGIT2 COMMON ANODE
6.	D CATHODE
7.	E CATHODE
8.	C CATHODE
9.	B CATHODE
10.	DIGIT1 COMMON ANODE

### PINOUT 2

PIN NO.	FUNCTION
1.	G SEG ANODE
2.	NO PIN
3.	A SEG ANODE
4.	F SEG ANODE
5.	DIGIT2 COMMON CATHODE
6.	D SEG ANODE
7.	E SEG ANODE
8.	C SEG ANODE
9.	B SEG ANODE
10.	DIGIT1 COMMON CATHODE

## 0.4" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1240-11A	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	1
MTN2240-11A	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	1
MTN4240-11A	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN4240R-11A	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN7240-11A	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	1



### PINOUT 1

PIN NO.	FUNCTION
1.	D1, D2 CATHODE
2.	DP1, DP2 CATHODE
3.	E1, E2 CATHODE
4.	C1, C2 CATHODE
5.	DIGIT2, DP2 COMMON ANODE
6.	B1, B2 CATHODE
7.	A1, A2 CATHODE
8.	F1, F2 CATHODE
9.	G1, G2 CATHODE
10.	DIGIT1, DP1 COMMON ANODE



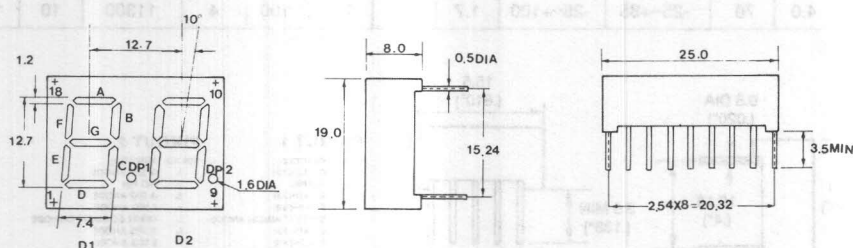
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# Dual Digit Seven Segment Display

## 0.5" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1250-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	2
MTN2250-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	2
MTN4250-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN4250-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTN7250-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	2
MTN1250-ASR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	1
MTN2250-AG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	1
MTN4250-AO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN4250-AHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTN7250-AUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	1



PINOUT 1

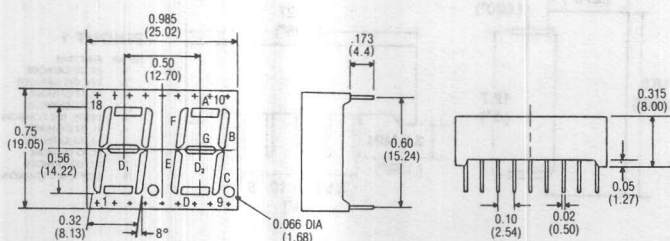
PIN #	FUNCTION
1.	D1 CATHODE E
2.	D1 CATHODE D
3.	D1 CATHODE C
4.	DP1 CATHODE
5.	D2 CATHODE E
6.	D2 CATHODE D
7.	D2 CATHODE G
8.	D2 CATHODE C
9.	DP2 CATHODE
10.	D2 CATHODE B
11.	D2 CATHODE A
12.	D2 CATHODE F
13.	D2 COMMON ANODE
14.	D1 COMMON ANODE
15.	D1 CATHODE B
16.	D1 CATHODE A
17.	D1 CATHODE G
18.	D1 CATHODE F

PINOUT 2

PIN #	FUNCTION
1.	D1 ANODE E
2.	D1 ANODE D
3.	D1 ANODE C
4.	DP1 ANODE
5.	D2 ANODE E
6.	D2 ANODE D
7.	D2 ANODE G
8.	D2 ANODE C
9.	DP2 ANODE
10.	D2 ANODE B
11.	D2 ANODE A
12.	D2 ANODE F
13.	D2 COMMON CATHODE
14.	D1 COMMON CATHODE
15.	D1 ANODE B
16.	D1 ANODE A
17.	D1 ANODE G
18.	D1 ANODE F

## 0.56" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1256-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN2256-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN4256-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN4256-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7256-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2
MTN1256-ASR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN2256-AG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN4256-AO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN4256-AHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7256-AUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1



PINOUT 1

PIN #	FUNCTION
1.	D1 CATHODE E
2.	D1 CATHODE D
3.	D1 CATHODE C
4.	D1 CATHODE DP
5.	D2 CATHODE E
6.	D2 CATHODE D
7.	D2 CATHODE G
8.	D2 CATHODE C
9.	D2 CATHODE DP
10.	D2 CATHODE B
11.	D2 CATHODE A
12.	D2 CATHODE F
13.	D2 COMMON ANODE
14.	D1 COMMON ANODE
15.	D1 CATHODE B
16.	D1 CATHODE A
17.	D1 CATHODE G
18.	D1 CATHODE F

PINOUT 2

PIN #	FUNCTION
1.	D1 ANODE E
2.	D1 ANODE D
3.	D1 ANODE C
4.	D1 ANODE DP
5.	D2 ANODE E
6.	D2 ANODE D
7.	D2 ANODE G
8.	D2 ANODE C
9.	D2 ANODE DP
10.	D2 ANODE B
11.	D2 ANODE A
12.	D2 ANODE F
13.	D2 COMMON CATHODE
14.	D1 COMMON CATHODE
15.	D1 ANODE B
16.	D1 ANODE A
17.	D1 ANODE G
18.	D1 ANODE F



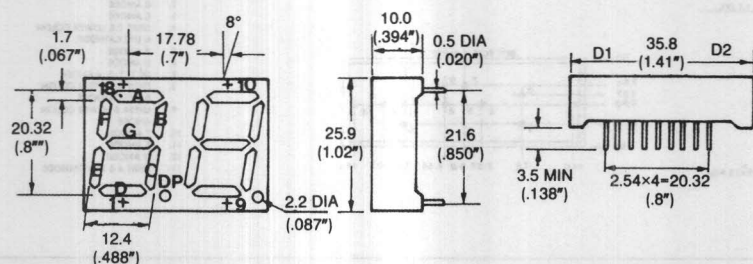
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# 2 & 3 Digit Seven Segment Display

## 0.8" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1280-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	650	10	2
MTN2280-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3250	10	2
MTN4280-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	2
MTN4280-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	2
MTN7280-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	14700	10	2
MTN1280-ASR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	650	10	1
MTN2280-AG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3250	10	1
MTN4280-AO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	1
MTN4280-AHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3770	10	1
MTN7280-AUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	14700	10	1



PINOUT 1

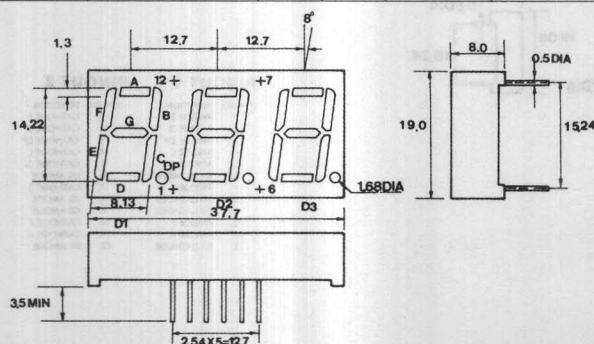
PIN NO.	FUNCTION
1.	D1 CATHODE E
2.	D1 CATHODE D
3.	D1 CATHODE C
4.	D1 CATHODE DP
5.	D2 CATHODE E
6.	D2 CATHODE D
7.	D2 CATHODE G
8.	D2 CATHODE C
9.	D2 CATHODE DP
10.	D2 CATHODE B
11.	D2 CATHODE A
12.	D2 CATHODE F
13.	D2 COMMON ANODE
14.	D1 COMMON ANODE
15.	D1 CATHODE B
16.	D1 CATHODE A
17.	D1 CATHODE G
18.	D1 CATHODE F

PINOUT 2

PIN NO.	FUNCTION
1.	D1 ANODE E
2.	D1 ANODE D
3.	D1 ANODE C
4.	D1 ANODE DP
5.	D2 ANODE E
6.	D2 ANODE D
7.	D2 ANODE G
8.	D2 ANODE C
9.	D2 ANODE DP
10.	D2 COMMON CATHODE
11.	D2 ANODE A
12.	D2 ANODE F
13.	D2 COMMON CATHODE
14.	D1 COMMON CATHODE
15.	D1 ANODE B
16.	D1 ANODE A
17.	D1 ANODE G
18.	D1 ANODE F

## 0.56" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1356-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN2356-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN4356-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN4356-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7356-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2
MTN1356-ASR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN2356-AG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN4356-AO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN4356-AHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7356-AUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1



PINOUT 1

PIN NO.	FUNCTION
1.	E SEG ANODE
2.	D SEG ANODE
3.	DP ANODE
4.	C SEG ANODE
5.	G SEG ANODE
6.	NC
7.	B SEG ANODE
8.	D3 COMMON CATHODE
9.	D2 COMMON CATHODE
10.	F SEG ANODE
11.	A SEG ANODE
12.	D1 COMMON CATHODE

PINOUT 2

PIN NO.	FUNCTION
1.	E SEG CATHODE
2.	D SEG CATHODE
3.	DP CATHODE
4.	C SEG CATHODE
5.	G SEG CATHODE
6.	NC
7.	B SEG CATHODE
8.	D3 COMMON ANODE
9.	D2 COMMON ANODE
10.	F SEG CATHODE
11.	A SEG CATHODE
12.	D1 COMMON ANODE



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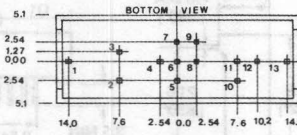
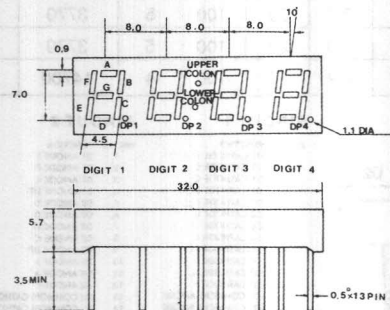
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# 4 Digit Seven Segment Display

## 0.28" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1428-CSR	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3.0	500	10	1
MTN2428-CG	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5.0	2500	10	1
MTN4428-CO	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5.0	2900	10	1
MTN4428-CHR	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5.0	2900	10	1
MTN7428-CUR	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4.0	11300	10	1

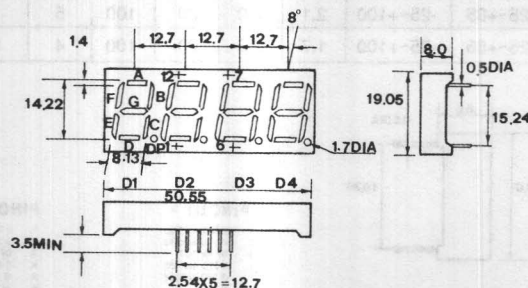


### PINOUT 1

PIN NO.	FUNCTION
1.	DIGIT 1 & DP1 CATHODE
2.	B ANODE
3.	C ANODE
4.	DIGIT 2 & LOWER COLON & DP2 CATHODE
5.	A ANODE
6.	D ANODE
7.	DP 1, 2, 3, 4 ANODE
8.	DIGIT 3 & UPPER COLON & DP3 CATHODE
9.	UPPER & LOWER COLON ANODE
10.	F ANODE
11.	E ANODE
12.	G ANODE
13.	DIGIT 4 & DP4 CATHODE

## 0.56" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTN1456-11C	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	2
MTN2456-11C	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	2
MTN4456-11C	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN4456R-11C	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	2
MTN7456-11C	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	2
MTN1456-11A	655	Red	30	3.0	100	-25~+85	-25~+100	1.7	2.0	20	100	3	500	10	1
MTN2456-11A	567	Green	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2500	10	1
MTN4456-11A	635	Orange	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN4456R-11A	635	Hi-Eff Red	30	5.0	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2900	10	1
MTN7456-11A	660	Ultra-Red	30	4.0	70	-25~+85	-25~+100	1.7	2.2	20	100	4	11300	10	1



### PINOUT 1

PIN NO.	FUNCTION
1.	ANODE E
2.	ANODE D
3.	ANODE DP
4.	ANODE C
5.	ANODE G
6.	D4 CATHODE
7.	ANODE B
8.	D3 CATHODE
9.	D2 CATHODE
10.	ANODE F
11.	ANODE A
12.	D1 CATHODE

### PINOUT 2

PIN NO.	FUNCTION
1.	CATHODE E
2.	CATHODE D
3.	CATHODE DP
4.	CATHODE C
5.	CATHODE G
6.	D4 ANODE
7.	CATHODE B
8.	D3 ANODE
9.	D2 ANODE
10.	CATHODE F
11.	CATHODE A
12.	D1 ANODE



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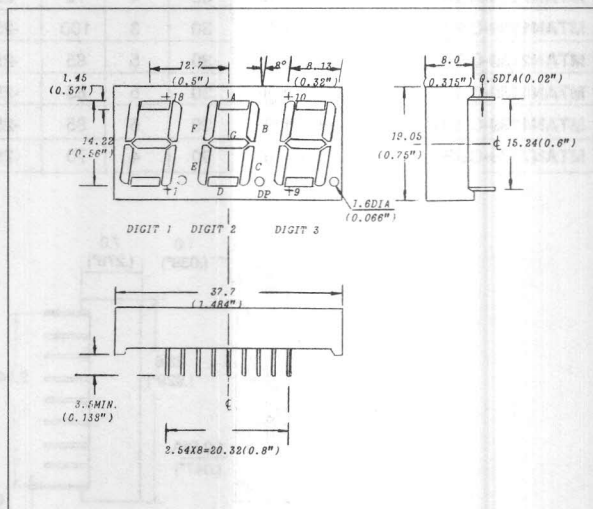
# Intelligent 7-Segment Displays

## FEATURES

- Built-in shift registers and LED drivers
- Saves space
- Economical
- Can control brightness

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	PEAK WAVE LENGTH (nm)	EMITTED COLOR	LUMINOUS INTENSITY (mcd)/seg.	
			min.	typ.
MTN1356-11I	655	GaAsP Red	.3	.5
MTN5356-11I	700	GaP Red	.54	.9
MTN2356-11I	567	Yellow Green	1.11	1.85
MTN3356-11I	585	Yellow	1.05	1.75
MTN4356-11I	635	Orange	1.2	2.0
MTN4356R-11I	635	Hi-Eff Red	1.2	2.0
Test Condition	Ibrcont=400μA			



MTNX356-11I

## STATIC-ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
VDD Supply Voltage		4.75	-	13.2	V
VDD Supply Current	Excluding Output Loads	-	-	7	mA
VLED Supply Voltage		2.8	-	3.5	V
Input Voltage					
Logical "0" Level	±10μA Input Bias	-0.3	-	0.8	V
Logical "1" Level	4.75 ≤ VDD ≤ 5.25	2.2	-	VDD	V
	VDD > 5.25	VDD-2	-	VDD	V
Input Clock Frequency		0	-	0.5	MHz
LED Current Segment					
Segment Off	Ibrcont = 0μA	-	-	10	μA
Segment On	Ibrcont = 100μA	-	3	-	mA
	Ibrcont = 200μA	-	6	-	mA
	Ibrcont = 400μA	-	10	-	mA
	Ibrcont = 750μA	15	-	25	mA

PIN #	FUNCTION
1.	VSS
2.	VLED
3.	VLED
4.	BIT 25 OUTPUT
5.	BIT 26 OUTPUT
6.	BIT 27 OUTPUT
7.	BIT 28 OUTPUT
8.	BIT 29 OUTPUT
9.	BIT 30 OUTPUT
10.	BIT 31 OUTPUT
11.	BIT 32 OUTPUT
12.	BIT 33 OUTPUT
13.	BIT 34 OUTPUT
14.	DATA ENABLE
15.	DATA INPUT
16.	CLOCK INPUT
17.	VDD
18.	BRIGHTNESS CONTROL



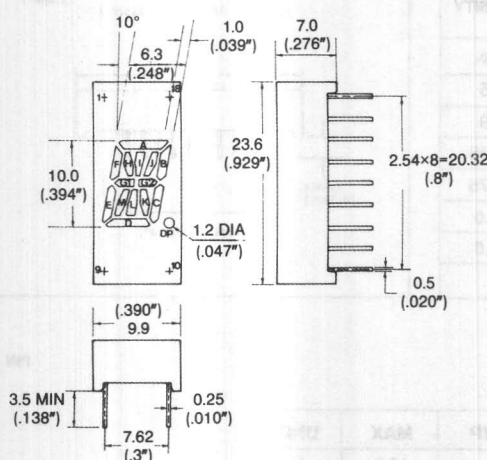
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# Single Digit Alpha Numerics

## 0.39" DIGIT SIZE - R.H.D.P.

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1139-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	1
MTAN2139-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	1
MTAN4139-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTAN4139-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	1
MTAN7139-AHR	660	Ultra Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	1
MTAN1139-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	450	10	2
MTAN2139-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2250	10	2
MTAN4139-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTAN4139-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2610	10	2
MTAN7139-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10180	10	2



### PINOUT 1

PIN NO.	CONNECTION
1.	I SEG CATHODE
2.	H SEG CATHODE
3.	F SEG CATHODE
4.	COMMON ANODE
5.	G1 SEG CATHODE
6.	E SEG CATHODE
7.	M SEG CATHODE
8.	D SEG CATHODE
9.	L SEG CATHODE
10.	K SEG CATHODE
11.	C SEG CATHODE
12.	DP SEG CATHODE
13.	COMMON ANODE
14.	G2 SEG CATHODE
15.	B SEG CATHODE
16.	J SEG CATHODE
17.	COMMON ANODE
18.	A SEG CATHODE

### PINOUT 2

PIN NO.	FUNCTION
1.	I ANODE
2.	H ANODE
3.	F ANODE
4.	COMMON CATHODE
5.	G1 ANODE
6.	E ANODE
7.	M ANODE
8.	D ANODE
9.	L ANODE
10.	K ANODE
11.	C ANODE
12.	DP ANODE
13.	COMMON CATHODE
14.	G2 ANODE
15.	B ANODE
16.	J ANODE
17.	COMMON CATHODE
18.	A ANODE



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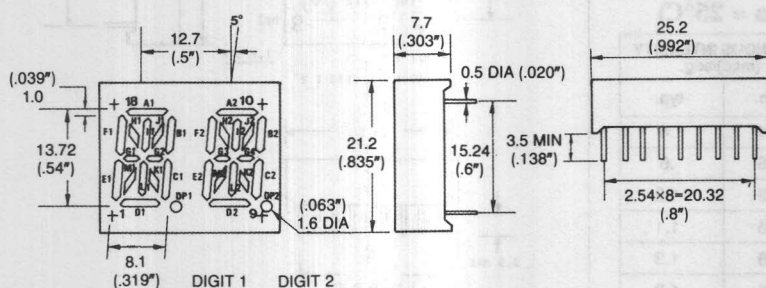
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# Dual Digit Alpha Numerics

## 0.54" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1254-21A	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	550	10	1
MTAN2254-21A	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2750	10	1
MTAN4254-21A	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	1
MTAN4254R-21A	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	1
MTAN7254-21A	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12400	10	1
MTAN1254-21C	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	550	10	2
MTAN2254-21C	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2750	10	2
MTAN4254-21C	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	2
MTAN4254R-21C	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	2
MTAN7254-21C	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12400	10	2



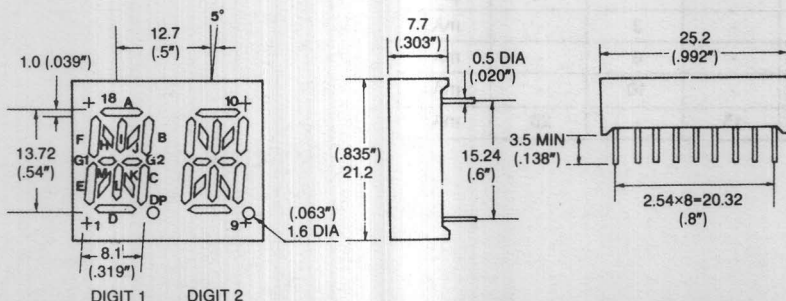
PINOUT 1 HAVE OPPOSITE POLARITY

### PINOUT 2

PIN NO.	FUNCTION	PIN NO.	FUNCTION
1.	G1 ANODE (CATHODE 1)	11.	NO PIN
2.	G2 ANODE (CATHODE 2)	12.	A1 ANODE (CATHODE 1)
3.	G3 ANODE (CATHODE 3)	13.	A2 ANODE (CATHODE 2)
4.	G4 ANODE (CATHODE 4)	14.	D1 ANODE (CATHODE 3)
5.	NO PIN	15.	D2 ANODE (CATHODE 4)
6.	K1 ANODE (CATHODE 3)	16.	NO PIN
7.	K2 ANODE (CATHODE 4)	17.	NO PIN
8.	M1 ANODE (CATHODE 1)	18.	NO PIN
9.	M2 ANODE (CATHODE 2)		
10.	C1 ANODE (CATHODE 3)		
	C2 ANODE (CATHODE 4)		
	E1 ANODE (CATHODE 1)		
	E2 ANODE (CATHODE 2)		
	CATHODE 3		
	DP1 ANODE (CATHODE 3)		
	NO PIN		
	CATHODE 2		
	DP2 ANODE (CATHODE 4)		
	CATHODE 4		

## 0.54" DIGIT SIZE

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1254-11A	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	550	10	1
MTAN2254-11A	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2750	10	1
MTAN4254-11A	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	1
MTAN4254R-11A	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	1
MTAN7254-11A	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12400	10	1
MTAN1254-11C	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	550	10	2
MTAN2254-11C	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2750	10	2
MTAN4254-11C	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	2
MTAN4254R-11C	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3190	10	2
MTAN7254-11C	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12400	10	2



### PINOUT 1

PIN NO.	FUNCTION
1.	E CATHODE
2.	M CATHODE
3.	NO CONNECTION
4.	L CATHODE
5.	K CATHODE
6.	G2 CATHODE
7.	D CATHODE
8.	DP CATHODE
9.	C CATHODE
10.	B CATHODE
11.	DIGIT 2 COMMON ANODE
12.	A CATHODE
13.	G1 CATHODE
14.	J CATHODE
15.	I CATHODE
16.	DIGIT 1 COMMON ANODE
17.	H CATHODE
18.	F CATHODE

### PINOUT 2

PIN NO.	FUNCTION
1.	E ANODE
2.	M ANODE
3.	NO CONNECTION
4.	L ANODE
5.	K ANODE
6.	G2 ANODE
7.	D ANODE
8.	DP ANODE
9.	C ANODE
10.	B ANODE
11.	DIGIT 2 COMMON CATHODE
12.	A ANODE
13.	G1 ANODE
14.	J ANODE
15.	I ANODE
16.	DIGIT 1 COMMON CATHODE
17.	H ANODE
18.	F ANODE

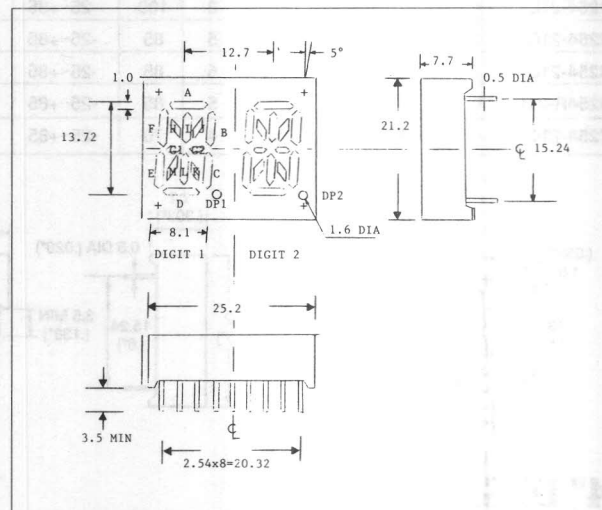
# Intelligent Alpha-Numeric Displays

## FEATURES

- Built-in shift registers and LED drivers
- Saves space
- Economical
- Can control brightness

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	PEAK WAVE LENGTH (nm)	EMITTED COLOR	LUMINOUS INTENSITY (mcd)/seg.	
			min.	typ.
MTAN1254-111	655	GaAsP Red	.24	.4
MTAN5254-111	700	GaP Red	.36	.6
MTAN2254-111	567	Yellow Green	.72	1.2
MTAN3254-111	585	Yellow	.66	1.1
MTAN4254-111	635	Orange	.78	1.3
MTAN4254R-111	635	Hi-Eff Red	.78	1.3
Test Condition		Ibrcont = 400μA		



## STATIC-ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
VDD Supply Voltage		4.75	-	13.2	V
VDD Supply Current	Excluding Output Loads	-	-	7	mA
VLED Supply Voltage		2.8	-	3.5	V
Input Voltage					
Logical "0" Level	±10μA Input Bias	-0.3	-	0.8	V
Logical "1" Level	4.75 ≤ VDD ≤ 5.25	2.2	-	VDD	V
	VDD > 5.25	VDD-2	-	VDD	V
Input Clock Frequency		0	-	0.5	MHz
LED Current Segment					
Segment Off	Ibrcont = 0μA	-	-	10	μA
Segment On	Ibrcont = 100μA	-	3	-	mA
	Ibrcont = 200μA	-	6	-	mA
	Ibrcont = 400μA	-	10	-	mA
	Ibrcont = 750μA	15	-	25	mA

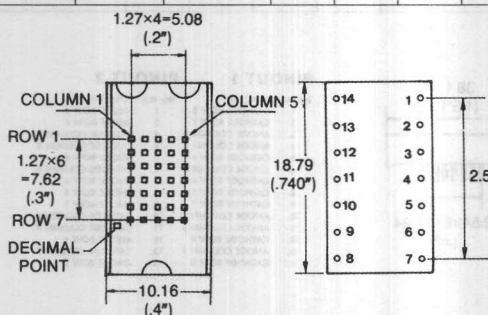
## MTANX254-111

PIN #	FUNCTION
1.	BIT 32 OUTPUT
2.	BIT 33 OUTPUT
3.	BIT 34 OUTPUT
4.	DATA INPUT
5.	CLOCK INPUT
6.	DATA ENABLE
7.	VDD
8.	VLED
9.	BRIGHTNESS CONTROL
10.	NO PIN
11.	NO PIN
12.	NO PIN
13.	VSS
14.	VSS
15.	NO PIN
16.	NO PIN
17.	BIT 31 OUTPUT
18.	NO PIN

# Dot Matrix Display

## 0.3" DIGIT SIZE - 5x7

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1135-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	400	10	1
MTAN2135-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2000	10	1
MTAN4135-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2320	10	1
MTAN4135-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2320	10	1
MTAN7135-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	9050	10	1
MTAN1135-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	400	10	2
MTAN2135-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2000	10	2
MTAN4135-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2320	10	2
MTAN4135-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2320	10	2
MTAN7135-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	9050	10	2



### PINOUT 1

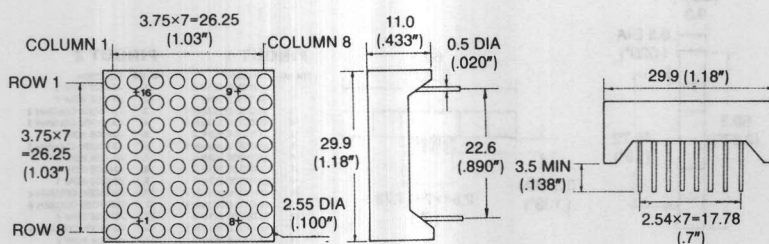
PIN NO.	FUNCTION
PIN 1	ANODE COLUMN 2
PIN 2	CATHODE ROW 1
PIN 3	CATHODE ROW 3
PIN 4	CATHODE ROW 4
PIN 5	ANODE COLUMN 1
PIN 6	NO PIN
PIN 7	DECIMAL POINT ANODE
PIN 8	ANODE COLUMN 3
PIN 9	CATHODE ROW 7
PIN 10	CATHODE ROW 6
PIN 11	CATHODE ROW 5
PIN 12	CATHODE ROW 2
PIN 13	ANODE COLUMN 5
PIN 14	ANODE COLUMN 4

### PINOUT 2

PIN NO.	FUNCTION
1.	CATHODE COLUMN 2
2.	ANODE ROW 1
3.	ANODE ROW 3
4.	ANODE ROW 4
5.	CATHODE COLUMN 1
6.	NO PIN
7.	DECIMAL POINT CATHODE
8.	CATHODE COLUMN 3
9.	ANODE ROW 7 & DECIMAL POINT ANODE
10.	ANODE ROW 6
11.	ANODE ROW 5
12.	ANODE ROW 2
13.	CATHODE COLUMN 5
14.	CATHODE COLUMN 4

## 1.2" DIGIT SIZE - 8x8

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin-Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1112-11A	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	480	10	1
MTAN2112-11A	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2400	10	1
MTAN4112-11A	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2780	10	1
MTAN4112R-11A	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2780	10	1
MTAN7112-11A	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10800	10	1
MTAN1112-21C	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	480	10	2
MTAN2112-21C	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2400	10	2
MTAN4112-21C	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2780	10	2
MTAN4112R-21C	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2780	10	2
MTAN7112-21C	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	10800	10	2



### PINOUT 1

PIN NO.	FUNCTION
1.	ANODE COLUMN 1
2.	ANODE COLUMN 2
3.	ANODE COLUMN 3
4.	ANODE COLUMN 4
5.	CATHODE ROW 5
6.	CATHODE ROW 6
7.	CATHODE ROW 7
8.	CATHODE ROW 8
9.	ANODE COLUMN 8
10.	ANODE COLUMN 7
11.	ANODE COLUMN 6
12.	ANODE COLUMN 5
13.	CATHODE ROW 4
14.	CATHODE ROW 3
15.	CATHODE ROW 2
16.	CATHODE ROW 1

### PINOUT 2

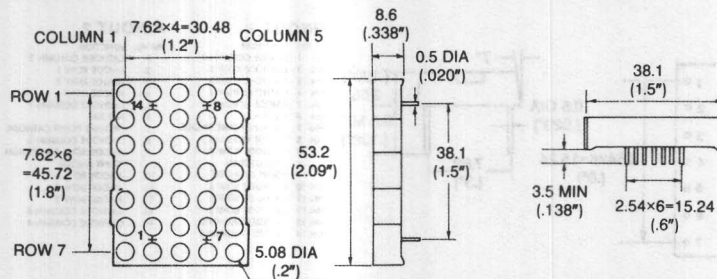
PIN NO.	FUNCTION
1.	CATHODE COLUMN 1
2.	CATHODE COLUMN 2
3.	CATHODE COLUMN 3
4.	CATHODE COLUMN 4
5.	ANODE ROW 5
6.	ANODE ROW 6
7.	ANODE ROW 7
8.	ANODE ROW 8
9.	CATHODE COLUMN 8
10.	CATHODE COLUMN 7
11.	CATHODE COLUMN 6
12.	CATHODE COLUMN 5
13.	ANODE ROW 4
14.	ANODE ROW 3
15.	ANODE ROW 2
16.	ANODE ROW 1



# Dot Matrix Display

## 2.0" DIGIT SIZE - 5x7

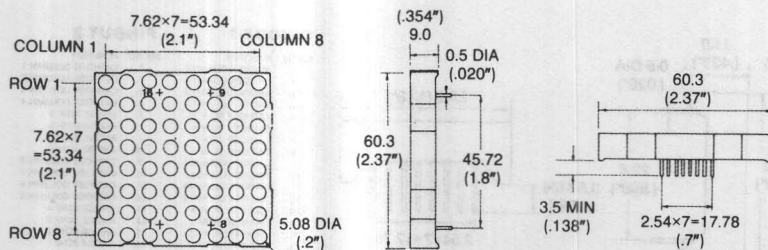
PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1120-ASR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	560	10	1
MTAN2120-AG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2800	10	1
MTAN4120-AO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	1
MTAN4120-AHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	1
MTAN7120-AUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12600	10	1
MTAN1120-CSR	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	560	10	2
MTAN2120-CG	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2800	10	2
MTAN4120-CO	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	2
MTAN4120-CHR	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	2
MTAN7120-CUR	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12600	10	2



PIN NO.	FUNCTION	PIN NO.	FUNCTION
1.	CATHODE ROW 5	1.	ANODE ROW 5
2.	CATHODE ROW 7	2.	ANODE ROW 7
3.	ANODE COLUMN 2	3.	CATHODE COLUMN 2
4.	ANODE COLUMN 3	4.	CATHODE COLUMN 3
5.	CATHODE ROW 4	5.	ANODE ROW 4
6.	ANODE COLUMN 5	6.	CATHODE COLUMN 5
7.	CATHODE ROW 6	7.	ANODE ROW 6
8.	CATHODE ROW 3	8.	ANODE ROW 3
9.	CATHODE ROW 1	9.	ANODE ROW 1
10.	ANODE COLUMN 4	10.	CATHODE COLUMN 4
11.	ANODE COLUMN 3	11.	CATHODE COLUMN 3
12.	CATHODE ROW 4	12.	ANODE ROW 4
13.	ANODE COLUMN 1	13.	CATHODE COLUMN 1
14.	CATHODE ROW 2	14.	ANODE ROW 2

## 2.3" DIGIT SIZE - 8x8

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1123-11A	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	560	10	1
MTAN2123-11A	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2820	10	1
MTAN4123-11A	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	1
MTAN4123R-11A	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	1
MTAN7123-11A	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12600	10	1
MTAN1123-21C	655	Red	30	3	100	-25~+85	-25~+100	1.7	2.0	20	100	3	560	10	2
MTAN2123-21C	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	2820	10	2
MTAN4123-21C	635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	2
MTAN4123R-21C	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	3240	10	2
MTAN7123-21C	660	Ultra-Red	30	4	70	-25~+85	-25~+100	1.7	2.2	20	100	4	12600	10	2



PIN NO.	FUNCTION	PIN NO.	FUNCTION
1.	CATHODE ROW 5	1.	ANODE ROW 5
2.	CATHODE ROW 7	2.	ANODE ROW 7
3.	ANODE COLUMN 2	3.	CATHODE COLUMN 2
4.	ANODE COLUMN 3	4.	CATHODE COLUMN 3
5.	CATHODE ROW 8	5.	ANODE ROW 8
6.	ANODE COLUMN 5	6.	CATHODE COLUMN 5
7.	CATHODE ROW 4	7.	ANODE ROW 4
8.	CATHODE ROW 3	8.	ANODE ROW 3
9.	CATHODE ROW 1	9.	ANODE ROW 1
10.	ANODE COLUMN 4	10.	CATHODE COLUMN 4
11.	ANODE COLUMN 6	11.	CATHODE COLUMN 6
12.	CATHODE ROW 4	12.	ANODE ROW 4
13.	ANODE COLUMN 1	13.	CATHODE COLUMN 1
14.	CATHODE ROW 2	14.	ANODE ROW 2
15.	ANODE COLUMN 7	15.	CATHODE COLUMN 7
16.	ANODE COLUMN 8	16.	CATHODE COLUMN 8

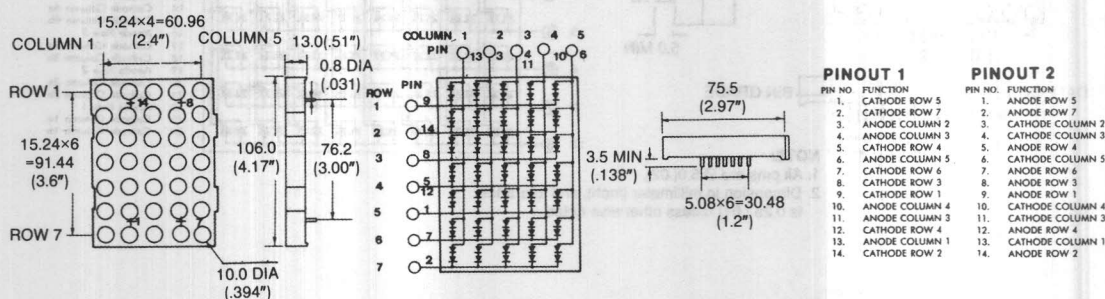


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# Dot Matrix Display

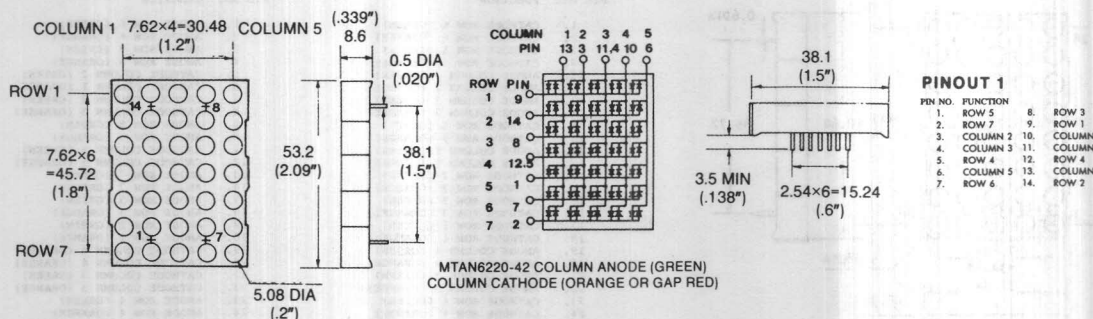
## 4.0" DIGIT SIZE - 5x7

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN1140-12A	655	Red	30	3	100	-25~+85	-25~+100	3.4	4.0	20	100	3	1000	10	1
MTAN2140-12A	567	Green	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5000	10	1
MTAN4140-12A	635	Orange	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5800	10	1
MTAN4140R-12A	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5800	10	1
MTAN7140-12A	660	Ultra Red	30	4	70	-25~+85	-25~+100	3.4	4.4	20	100	4	22600	10	1
MTAN1140-22C	655	Red	30	3	100	-25~+85	-25~+100	3.4	4.0	20	100	3	1000	10	2
MTAN2140-22C	567	Green	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5000	10	2
MTAN4140-22C	635	Orange	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5800	10	2
MTAN4140R-22C	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	4.1	6.0	20	100	5	5800	10	2
MTAN7140-22C	660	Ultra Red	30	4	70	-25~+85	-25~+100	3.4	4.4	20	100	4	22600	10	2



## BI-COLOR DOT MATRIX - 2.0" DIGIT SIZE - 5x7

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS					Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	Topr (°C)	Tstg (°C)	V <sub>F</sub> @20mA(V)		V <sub>R</sub> @100μA (V)	I <sub>V</sub> per seg. (μcd)	I <sub>F</sub> (mA)	
								typ.	max.				
MTAN6220-42	O 635	Orange	30	5	85	-25~+85	-25~+100	2.1	3.0	5	3240	10	1
	G 567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	5	2800	10	1
MTAN6220-52	R 700	Red	30	5	85	-25~+85	-25~+100	2.1	3.0	5	840	10	1
	G 567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	5	2800	10	1

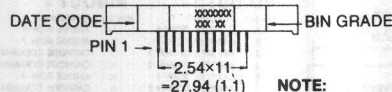
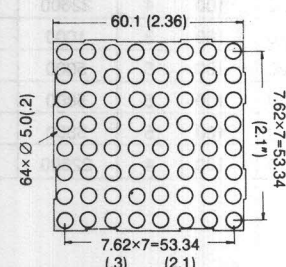




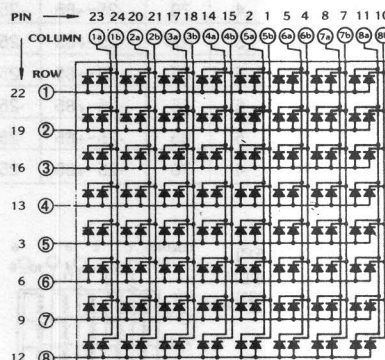
# Bi-Color Dot Matrix Display

## 2.3" DIGIT SIZE - 8x8

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN8826-CHRG (HR)	635	Hi-Eff Red	25	5	75	-25~+85	-25~+85	2.1	2.8	20	100	5	4000	20	1
(G)	573	Yellow-Green	25	5	75	-25~+85	-25~+85	2.2	2.8	20	100	5	4000	20	1

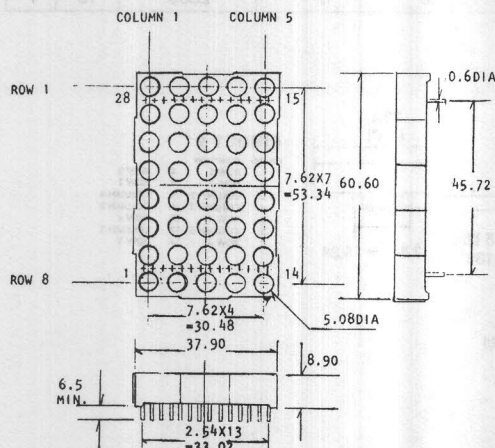


NOTE:  
1. All pins are  $\varnothing 5.0(.02)$ .  
2. Dimension in millimeter (inch), and tolerance is 0.25 (.01) unless otherwise noted.



## 2.4" DIGIT SIZE - 5x8

PART NO.	PEAK WAVE-LENGTH (nm)	EMITTED COLOR	MAXIMUM RATINGS					OPTO-ELECTRICAL CHARACTERISTICS							Pin Out
			I <sub>F</sub> (mA)	V <sub>R</sub> (V)	P <sub>D</sub> (mW)	T <sub>opr</sub> (°C)	T <sub>stg</sub> (°C)	V <sub>F</sub> (V)			I <sub>R</sub> (μA)		I <sub>V</sub> (μcd)		
								typ.	max.	@mA	max.	@V <sub>R</sub>	typ. per seg	@mA	
MTAN6524-AHRG (HR)	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5800	10	1
(G)	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5000	10	1
MTAN6624-CHRG (HR)	635	Hi-Eff Red	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5800	10	2
(G)	567	Green	30	5	85	-25~+85	-25~+100	2.1	3.0	20	100	5	5000	10	2



MTAN6524-AHRG

PIN NO.	FUNCTION
1.	CATHODE ROW 6 (GREEN)
2.	CATHODE ROW 6 (ORANGE)
3.	CATHODE ROW 8 (GREEN)
4.	CATHODE ROW 8 (ORANGE)
5.	ANODE COLUMN 2 (GREEN)
6.	ANODE COLUMN 2 (ORANGE)
7.	ANODE COLUMN 3 (GREEN)
8.	ANODE COLUMN 3 (ORANGE)
9.	CATHODE ROW 5 (GREEN)
10.	CATHODE ROW 5 (ORANGE)
11.	ANODE COLUMN 5 (GREEN)
12.	ANODE COLUMN 5 (ORANGE)
13.	CATHODE ROW 7 (GREEN)
14.	CATHODE ROW 7 (ORANGE)
15.	CATHODE ROW 3 (GREEN)
16.	CATHODE ROW 3 (ORANGE)
17.	CATHODE ROW 1 (GREEN)
18.	CATHODE ROW 1 (ORANGE)
19.	ANODE COLUMN 4 (GREEN)
20.	ANODE COLUMN 4 (ORANGE)
21.	ANODE COLUMN 3 (GREEN)
22.	ANODE COLUMN 3 (ORANGE)
23.	CATHODE ROW 4 (GREEN)
24.	CATHODE ROW 4 (ORANGE)
25.	ANODE COLUMN 1 (GREEN)
26.	ANODE COLUMN 1 (ORANGE)
27.	CATHODE ROW 2 (GREEN)
28.	CATHODE ROW 2 (ORANGE)

MTAN6624-CHRG

PIN NO.	FUNCTION
1.	ANODE ROW 6 (GREEN)
2.	ANODE ROW 6 (ORANGE)
3.	ANODE ROW 8 (GREEN)
4.	ANODE ROW 8 (ORANGE)
5.	CATHODE COLUMN 2 (GREEN)
6.	CATHODE COLUMN 2 (ORANGE)
7.	CATHODE COLUMN 3 (GREEN)
8.	CATHODE COLUMN 3 (ORANGE)
9.	ANODE ROW 5 (GREEN)
10.	ANODE ROW 5 (ORANGE)
11.	CATHODE COLUMN 5 (GREEN)
12.	CATHODE COLUMN 5 (ORANGE)
13.	ANODE ROW 7 (GREEN)
14.	ANODE ROW 7 (ORANGE)
15.	ANODE ROW 3 (GREEN)
16.	ANODE ROW 3 (ORANGE)
17.	ANODE ROW 1 (GREEN)
18.	ANODE ROW 1 (ORANGE)
19.	CATHODE COLUMN 4 (GREEN)
20.	CATHODE COLUMN 4 (ORANGE)
21.	CATHODE COLUMN 3 (GREEN)
22.	CATHODE COLUMN 3 (ORANGE)
23.	ANODE ROW 4 (GREEN)
24.	ANODE ROW 4 (ORANGE)
25.	CATHODE COLUMN 1 (GREEN)
26.	CATHODE COLUMN 1 (ORANGE)
27.	ANODE ROW 2 (GREEN)
28.	ANODE ROW 2 (ORANGE)



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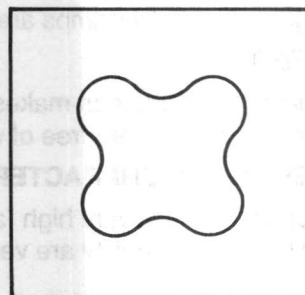
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# Visible Opto Electronic Materials

## FEATURES

- Customized wavelength sorting available
- Brightness binning available
- Ultra bright red available in 700nm
- All visible material utilizes Gold (Au) Alloy for both bonding and die attached surfaces



The above drawing does not necessarily represent the part numbers below. Consult Factory for individual specifications.

## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

PART NO.	DESCRIPTION	MATERIAL	PEAK WAVE LENGTH	DIE SIZE MILS	I <sub>V</sub> @ 20mA (mcd) TYP.	V <sub>F</sub> @ 20mA (V) MAX.	STRUCTURE
OPC7001	Ultra Bright Red	GaAlAs/GaAs	700	13x13	0.8**	2.1	P-down
OPC7002	GaP Red	GaP/GaP	700	13x13	0.7	2.2	P-up
OPC6601	Super Bright Red	GaAlAs/GaAlAs	660	15x15	3000	2.4	P-down
OPC6602	Extra Bright Red	GaAlAs/GaAlAs	660	13x13	3000	2.2	P-down
OPC6603	Ultra Bright Red	GaAlAs/GaAlAs	660	14x14	1800	2.3	P-down
OPC6604	Ultra Bright Red	GaAlAs/GaAlAs	660	14x14	1500	2.3	P-down
OPC6605	Ultra Bright Red	GaAlAs/GaAlAs	660	14x14	1000	2.3	P-down
OPC6606	Ultra Bright Red	GaAlAs/GaAlAs	660	12x12	1800	2.3	P-down
OPC6607	Ultra Bright Red	GaAlAs/GaAlAs	660	12x12	1500	2.3	P-down
OPC6608	Ultra Bright Red	GaAlAs/GaAlAs	660	12x12	1000	2.3	P-down
OPC6609	Super Red	GaAlAs/GaAs	660	12x12	8.0	2.4	P-down
OPC6610*	Standard Red	GaAsP/GaP	660	13x13	0.4	1.8	P-up
OPC6551	Standard Red	GaAlAs/GaAs	655	11x11	6.0	2.1	P-down
OPC6301	High Efficiency Red	GaAsP/GaP	630	12x12	7.0	2.4	P-up
OPC6151*	Orange	GaAsP/GaP	615	13x13	3.5	2.4	P-up
OPC5851	Yellow	GaAsP/GaP	585	14x14	7.0	2.4	P-up
OPC5681	Yellow/Green	GaP/GaP	568	12x12	3.5	2.2	P-up
OPC5651	Green	GaP/GaP	565	12x12	5.0	2.4	P-up
OPC5551	Pure Green	GaP/GaP	555	12x12	1.5	2.4	P-up

\*\*Specification listed in mW

\*Parts utilize aluminum for bonding surfaces



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# APPLICATION NOTES

## FEATURES OF LED LAMPS AND DISPLAYS

The features of LED lamps and displays become clear by comparison with tungsten filament incandescent lamps and discharge tubes in their light emitting mechanisms and structures.

Among the qualities of LED lamps are the following:

### 1. LONG LIFE-TIME

The light emitting phenomenon makes use of the injection light emitted to the P-N junction instead of thermal radiation, therefore, LEDs are free of waste and wear and they can be expected to have a long life.

### 2. EXCELLENT DRIVE CHARACTERISTIC

The LED response time is very high (a few hundred nano-seconds) and the forward voltage and current at the practical luminous intensity are very low (i.e.  $2V=10mA$ ), which makes it simpler to design the drive circuits.

### 3. STURDY MECHANICAL STRENGTH

The packages of LEDs are made of resin, so they have excellent mechanical strength and can withstand dropping, shock and other abuses.

## PRECAUTIONS WHEN USING LEDS

The following precautions should be taken when using LED lamps and displays:

### 1. SOLDERING

The softening temperature of the resin of which the LED's packages are made is generally low; less than about  $100^{\circ}C$ . This limits the soldering temperature and time to  $260^{\circ}C$  with a dwell time of less than 3 seconds.

### 2. WASHING

When the devices are washed in chemicals for removal of flux after soldering, the use of unsuitable chemicals results in a change in quality and color, and even cracks in the packages. The recommended chemicals for washing Marktech visible LED lamps are: Chlorothene, Freon TE or TF, Dai-Fron Solvent S3 or S3-E.

When the devices are ultrasonically washed in these chemicals, use an ultrasonic washing machine that has an output power of less than 300W; do not resonate the devices attached to the board. It is also strongly recommended that the printed circuit board does not touch the oscillator and the devices are washed in less than 30 seconds.



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# APPLICATION NOTES

## RECOMMENDED AC DRIVE TECHNIQUES

A precaution for the AC operation is that a reverse bias protective circuit is necessary for LED lamps, because normally LEDs should be operated in the forward biased direction. Since the maximum reverse voltage of a LED lamp is about 3 to 5V, a protective diode circuit as shown in Fig. 2-3 (a) and (b) is usually used.

The low forward voltage of the LED makes the displays inherently IC compatible. If large currents are required, a TTL buffer will be effective as shown in Fig. 2-2.

In this section, the maximum ratings of LED lamps and pulse drive methods are discussed. The absolute maximum ratings of LED lamps have been current, power dissipation, thermal resistance and LED junction temperature all interrelated in establishing absolute maximum rating. Particularly at the maximum operation temperature, the derating method should be taken.

The maximum forward current of LED lamps is decided on the following conditions:

1. The level of current density within the LED junction that does not exceed the acceptable amount of light output degradation.
2. The amount of power dissipation generated by the forward current that will maintain the LED junction at an acceptable temperature level below the glass transition temperature,  $T_G$ , of the encapsulating epoxy.

Therefore, the forward current should be derated so as to meet items (1) and (2) with a change of ambient temperature.

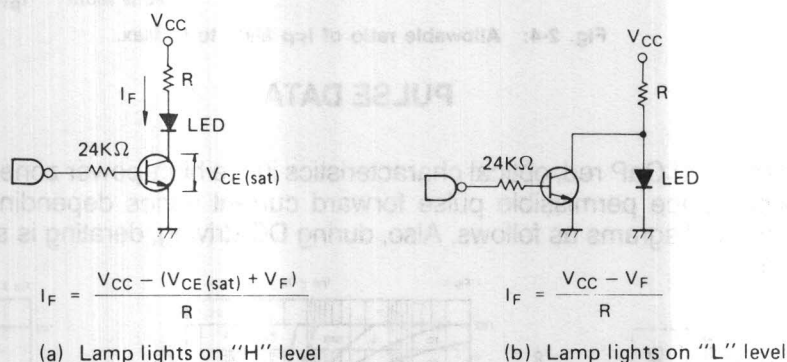


Fig. 2-2: Driving method by C-MOS IC

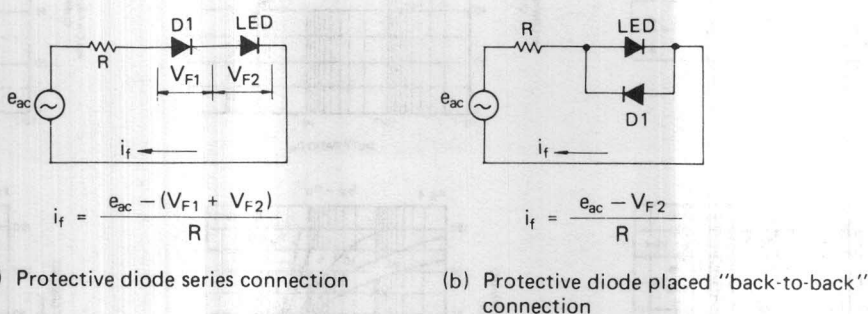


Fig. 2-3: AC drive circuit

Where  $e_{ac}$  : AC supply voltage  $V_{F1}$  : forward voltage of D1  
 D1 : protective diode  $V_{F2}$  : forward voltage of LED



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# APPLICATION NOTES

## FORWARD CURRENT FOR PULSED DRIVE

The pulsed drive is often used as a LED lamp drive method. In this case, the maximum tolerable limits should not exceed the LED junction temperature above what would be obtained by operating the lamp at the maximum DC current.

This interrelationship is most easily obtained by establishing combinations of peak current and pulse width, maintaining the maximum junction temperature at that value obtained by operating at the maximum DC current. These data are plotted on a log scale to form the family of curves shown in Fig. 2-4.

The rising rate of the junction depends on the transient thermal resistance, but usually the maximum peak current can be determined by using Fig. 2-4.

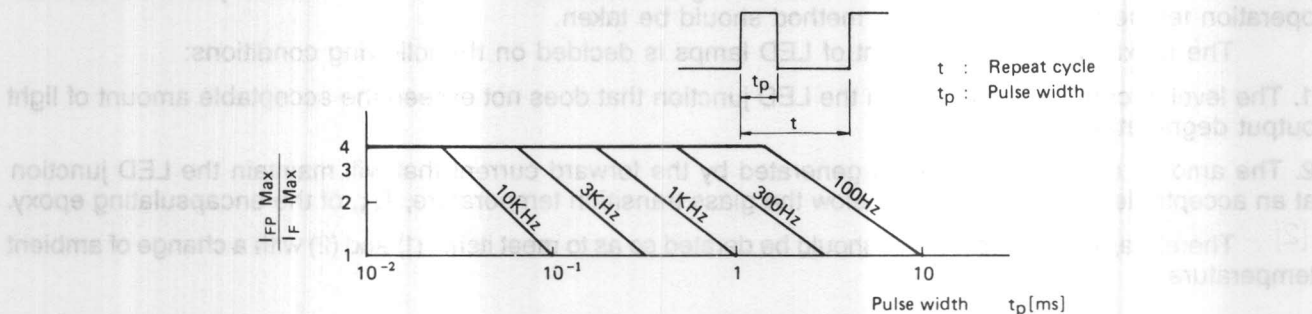


Fig. 2-4: Allowable ratio of  $I_{Fp} \text{ Max.}$  to  $I_F \text{ Max.}$

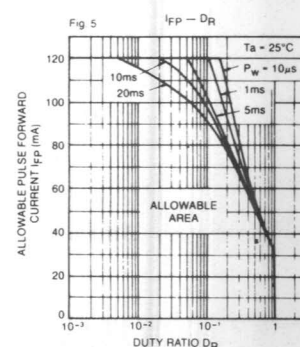
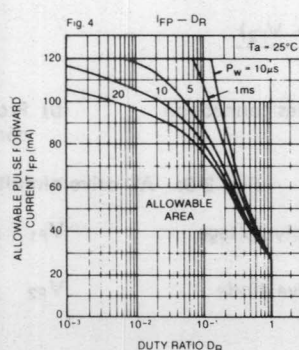
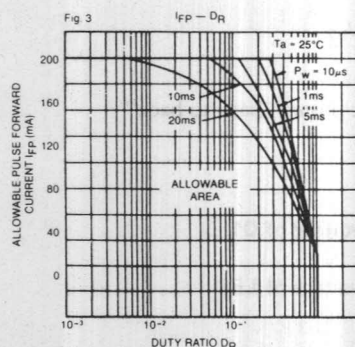
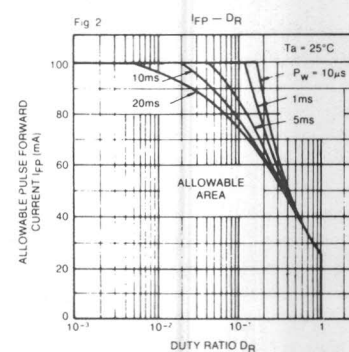
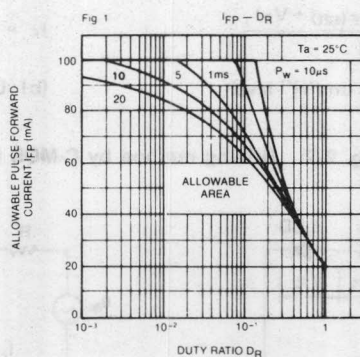
## PULSE DATA

### Pulse driving

With the exception of GaP red, optical characteristics in the high-power zone are excellent, permitting effective pulse driving. Since permissible pulse forward current varies depending on driving conditions, refer to the characteristic diagrams as follows. Also, during DC driving, derating is similarly required against ambient temperature.

Type	$I_F \text{ Max. (mA)}$	Allowable Pulse Forward Current $I_{Fp} \text{ Max. (mA)}$ Note	Fig. No.
GaP (Red)	20	100	1
MTxxx-R Type	25	100	2
GaAlAs (Red) (A Type)	50	200	3
All except for upper mentioned	25	120	4
	30		

NOTE  $P_w = 100\mu s$ ,  $A_{\theta} = 10^{-1}$



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# APPLICATION NOTES

## LED LAMP TAPING SPECIFICATIONS

By applying tape with a pitch of 2.54 mm or 5 mm, LED lamps can be mounted by using an automatic inserter. Also, either zigzag-wound or reel packing is available.

### [1] Designation

Taping name can be distinguished by the sub-name next to LED type name.

[ex.]

MT5000-UR (TPK51)

Taping specification

Type Name

### [2] Taping Specification

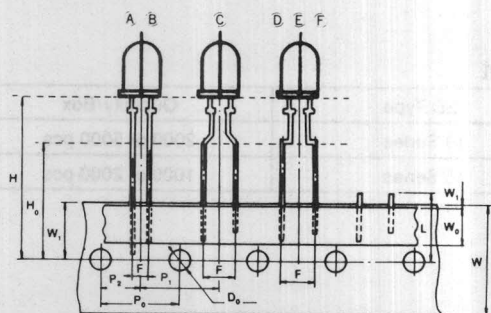
Taping specification can be distinguished by the table below: taping configuration, dimension, direction of tape feed and package method.

Taping Specification			Package Outline
Reel packing type		Ammo pack	
Anode lead-out	Cathode lead-out		
TPK1	TPKR1	TPK51	A
TPK5	TPKR5	TPK55	B
TPJ1	TRJR1	TPJ51	C
TPJ2	TRJR2	TPJ52	D
TPJ3	TPJR3	TPJ53	E
TPJ6	TPJR6	TPJ56	F

### [3] Package Outline and Dimensions

Package Outline

Dimensions



	A	B	C	D	E	F
H	23.35 ± 1.0	17.0 ± 1.0	23.35 ± 1.0	20.5 ± 1.0	22.5 ± 1.0	23.35 ± 1.0
H <sub>0</sub>	—		16.0 ± 0.5			
W	+ 1 18.0 - 0.5					
W <sub>0</sub>	6.0 ± 0.3					
W <sub>1</sub>	+ 0.75 9.0 - 0.5					
W <sub>2</sub>	≤0.5					
P <sub>0</sub>	12.7					
P <sub>1</sub>	12.7 ± 1 (Product Pitch)					
P <sub>2</sub>	6.35 ± 1.3					
F	+ 0.8 2.54 - 0.2		+ 0.8 5.00 - 0.2			
L	11.0MAX					
D <sub>0</sub>	φ4.0 ± 0.2					



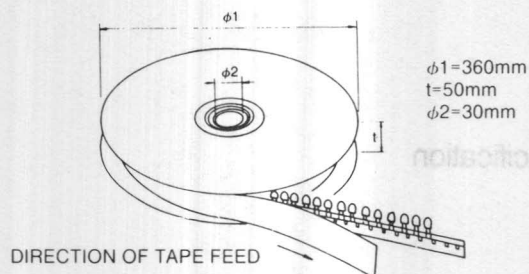
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# APPLICATION NOTES

## [4] Packaging Reel Packaging

### a) Reel type



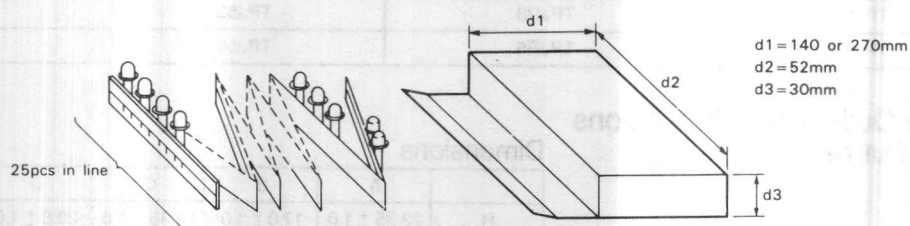
### Content

LED Type	Quantity/ Reel
$\phi 3$ Series	2000 pcs
$\phi 5$ Series	1000 pcs

### T-1 and T-1 3/4 packages

\*Lamps with external shapes other than those above are also suppliable. Please consult Marktech.

### b) Zigzag wound tape



At tape beginning and end, there is additional space for 4 pcs or more

### Content

LED Type	Quantity/Box
$\phi 3$ Series	2000 or 5000 pcs
$\phi 5$ Series	1000 or 2000 pcs



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